THE JOURNAL
OF THE
American Dental Association

VOL. 12 JULY, 1925 No. 7

Original Communications

THE CORRECT TIME FOR ORTHODONTIC TREATMENT

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(Read before the American Dental Association, Dallas, Texas, Nov. 10-14, 1924)

A STUDY of the correct time for orthodontic treatment is a most important feature of diagnosis. Many papers appear in the dental literature on this subject, and many of the most eminent orthodontists stress the need of early treatment. The nature of their views may perhaps be gathered in part from the extracts that follow.

We must always bear in mind that the treatment of malocclusion is not simply a mechanical problem but is essentially a matter of bone growth. Dr. James D. McCoy says:

The factor of age is an important consideration in tooth movement, as emphasized by Macewen, who states: "The younger the animal, the greater is the proliferating power of the bone cell, and the longer will it continue to proliferate before it assumes its mature form; consequently, the greater is the ossific production. The proliferating power of the osseous tissue of old animals is greatly reduced compared with those of animals in the evolutionary period, and the osteoblasts which are poured out from them pass quickly into their mature form."[1]

Dr. E. H. Angle writes:

The longer teeth remain in malocclusion, the more fixed becomes the variation from the normal in all co-related muscles and tissues. The tongue never having been permitted the normal freedom of a normal arch doubtless also fails to develop normally in form and function, and its muscles, together with the muscles of mastication and those about the mouth all become correspondingly modified in order to best adapt themselves to the established conditions of the teeth. In like man-

1. McCoy, J. D.: Applied Orthodontia, p. 173.

ner, the nose, in size and function, is often modified from the normal.

Logically, then, in the treatment of malocclusion our attention should be directed toward interpreting Nature's wishes and assisting her to carry out her original plan in the building of the denture, working hand in hand with her, for only as we comprehend her wishes in each individual case and assist her, will our efforts be successful in establishing the normal in occlusion and the normal in the balance of the mouth with the rest of the face. It should be obvious, then, to all thoughtful minds, that the demand in treatment should be the removal of pernicious causes, the retention of the full complement of teeth, and the compelling of their normal locking during or subsequent to their normal period of eruption, thus permitting Nature to complete the denture according to her fixed plan and the demands of the individual type.[2]

Later, in the same chapter, Dr. Angle writes:

What we have said presupposes the treatment of cases with the full complement of teeth, which we have had the opportunity to treat during their most active period of growth, development and eruption or during the period in which lie our greatest opportunities for assisting Nature in approximating the nearest to the ideal in the results.[3]

He further states, relative to the time for beginning treatment:

Recognizing the importance of the principle of normal occlusion as a basis in the treatment of malocclusion it becomes an axiom that the proper time to begin treatment is as near the beginning of the variation from the normal in the process of the development of the dental apparatus as possible.[4]

The author is more and more impressed with the advantages of beginning the treatment early, just as soon as malocclusion is manifest. Then Nature is putting forth her best efforts; then growth and repair are most rapid and the surrounding tissues most yielding; then slight force is sufficient to gently direct each erupting tooth into its correct relation with the line of occlusion. Unless some unusual physical condition of the patient exists it is unquestionably a serious mistake, without the least argument in its favor, to defer the operation until all the teeth shall have erupted, a time-honored custom still often advocated and followed by dentists. To such mistaken practice is directly traceable thousands of cases of pronounced malocclusion, with inevitably distorted facial lines, impaired speech, etc. By this time the whole dental apparatus will have become involved, the teeth firmly fixed in their malpositions, the facial lines badly marred, and the lips and muscles modified to work in harmony with the complicated malocclusion, all of which might have been easily prevented had the operation been begun at the proper age. There is another reason in favor of early treatment. We have already seen, in the study of the alveolar process and peridental membrane, that in young children the sockets of the teeth are large and the septa of bone often lacking to a considerable degree—Nature seemingly waiting until the positions of the teeth shall be determined before completing this precious structure. Now if the teeth be moved at this time into correct positions *the normal deposition of bone and development of the socket about the root of the tooth will follow*, while if delayed until the completion of Nature's period of active growth and development of the alveolar process, extensive absorption must take place, and the re-deposited bone may possibly be *less stable in quality*, or, we believe, even lacking entirely in portions in some instances. From experience in a few cases of attempting to correct malocclusions which had been years before unsuccessfully treated, the author has been strongly impressed with the apparently abnormal instability of the teeth which had been used for anchorage. This fact, together with the great difficulty in some cases of maintaining in their new positions teeth that have been moved after maturity, even after a long period of retention, strongly suggests the possibility that the secondary deposit of bone may never be as stable as that deposited during the normal period of development. Indeed the histologic investigations of Dr. Noyes seem to confirm this.

There is still another very important reason why the treatment of malocclusion should be begun early. It arrests not only increasing complexities of malocclusion of the teeth but also inharmony in the growth of the bones of the jaws, and consequent inharmony of growth and improper functionating of the muscles—always more or less an accompaniment of mal-

2. Angle, E. H.: Malocclusion of the Teeth, Ed. 7, p. 305.

3. Footnote 2, p. 307.

4. Footnote 2, p. 309.

occlusion, especially in Classes 2 and 3, and in gravity and extent necessarily proportionate to the age of the patient.

While as we have noted, the period for the treatment of malocclusion may extend to maturity, or, in favorable cases much later, we think that it may be regarded as a law that in proportion to the age of the patients is their sensitiveness to pain, the time required for treatment, the obstacles to be overcome, the inconvenience, the period of retention, and the uncertainty as to prognosis increased. The absurdity of delaying treatment with the hope that Nature will correct the deformity we have elsewhere pointed out.[5]

At a meeting of the Southern California Section of the Pacific Coast Society of Orthodontists, June 13, 1924, the following resolution was unanimously adopted:

Resolved: That it is advantageous to children suffering with malocclusion of the teeth to be placed under observation as soon as the condition becomes manifest, even though the deciduous teeth only are present, and that such cases should be watched and active measures instituted, if their necessity is clearly indicated, at such time as will prove most helpful to the patient, the age of 6 to 8 years being a favorable age.[6]

Dr. B. E. Lischer says:

It is well to remember that a favorable prognosis depends largely upon an early diagnosis, when conditions are such that a comparatively simple treatment will suffice. Formerly it was the custom to postpone most treatments until all of the permanent teeth had erupted, for it was believed that *Nature* would assist in the correction of the malocclusion, and that most patients would "outgrow" the deformity. Many bitter disappointments have taught us the error of such advice, and strongly emphasize the fact that the severe forms of malocclusion do not develop over night, but are of slow growth. Hence it follows that years before even an intelligent parent recognizes the impending deformity, the alert diagnostician can advise ways and means for its prevention.[7]

Owing to the mechanical aspects of dentition, the self-correction of most forms of malocclusion is an impossibility.[8]

Every fact gleaned from a study of the process of dentition substantiates the orthodontic axiom that *malocclusion and its accompanying deformities are progressive, not static.*[9]

The restoration of normal function during the developmental period is a fundamental principle of rational treatment.[10]

The period of tooth eruption is the period of greatest growth in the alveolar process.[11]

Dr. J. Lowe Young writes:

When the deciduous teeth are found to be in malocclusion to a marked degree, it is of the utmost importance that correction should be instituted as early as conditions will permit. The longer that such cases are allowed to go untreated the greater the difficulties encountered, and the less certain the final result. Believing that normal function is of the utmost importance in the development of the dental arches and masticating apparatus, then what can be more logical than that we establish such relations as early in life as possible so as to permit the teeth of the deciduous set to occlude properly.

If you will concede that the histologists have proven that bone is developed in accordance with mechanical stimuli, then it is most logical that you concede that when the deciduous teeth are in such relation that normal function is interfered with, normal development is impossible.[12]

Dr. H. W. Strang said:

One of the arguments often advanced against early treatment is the uncertainty of the permanent teeth erupting in normal occlusion after the deciduous arches have been developed. To be sure, one cannot say that the permanent teeth will take their correct position after such treatment has been carried out, but the following statement can be made to the parents: "We will place the deciduous teeth where Nature should have placed them at this age, and in so doing will give Nature

5. Footnote 2, p. 311.

6. Bull. Pacific Coast Soc. Orthodontists, Sept. 1, 1924, p. 39.

7. Lischer, B. E.: Orthodontics, p. 130.

8. Footnote 7, p. 133.

9. Footnote 7, p. 137.

10. Lischer, B. E.: Normal and Abnormal Dentofacial Development, J.A.D.A., 11: 729 (Aug.) 1924.

11. Footnote 10, p. 728.

12. Young, J. L.: Prevention of Malocclusion, J.N.D.A., 4: 841 (Aug.) 1917.

every possible chance to bring the permanent teeth into their proper position. We will relieve all dental impactions with their nervous symptoms, and will develop the nasal cavities to the size proper for their age. Then if we find later that Nature is not able to finish her work successfully, we shall not be handicapped with years of maldevelopment, but need only to take up the case again where it was left at the end of the previous treatment, and finish the work that Nature failed to do." So in all our treatment—our aim should be simply to aid Nature, always carrying out our work along normal lines, bringing the case up to that period of development which corresponds to the normal for that age, and incidentally by such treatment stimulating Nature to do better work.[13]

In the discussion of a paper by Dr. Frederick C. Kemple, Dr. Milton T. Watson said:

> That the proof of an actual enlargement of the nasal spaces through widening the upper arches is not conclusive, is, of course, the opinion of many men, though we all agree that normal respiration is improved in the majority of such cases, and this being true, it is certainly logical to do the operation as early as possible, for no one, so far as I know, doubts that the performance of its normal function is essential to the highest development of any organ.[14]

The statements quoted above, with other indications, show that the principle of early treatment is generally accepted by orthodontists as correct. But there is considerable difference of opinion among them as to what is meant by "early" treatment, their advice ranging from suggestions as to the nutrition of the prospective mother to suggestions regarding the child with a full complement of permanent teeth. Some recommend treatment of malocclusion of the deciduous teeth, and others consider the treatment "early" at the ages of 10 or 12 years. The basis for the true principle of "early" treatment, I believe, is suggested by several of the authors quoted; that is, treatment during the period of rapid growth and development of the teeth and jaws. It is to be interpreted, not by the actual age of the individual but by the development of his teeth and jaws and by the time when the particular malocclusion develops and may be recognized. Thus, early treatment means treatment at the time when the growth of the teeth and jaws makes orthodontic interference most advantageous in the particular individual and in the particular type of malocclusion developing. The advantages of ease of tooth movement, shorter periods of active treatment, and shorter periods of retention; the probability of better occlusion as a result, and the possible beneficial influence on the tissues closely associated with the jaws, including particularly the influence on the development of the nose and normal respiration, require no further specific mention.

For convenience in studying the question of the correct time for orthodontic treatment, the majority of cases may be classified into four groups:

Group A, ages 3 to 6 years; deciduous teeth only.

Group B, ages 6 to 8 years; period of eruption of permanent first molars and incisors.

Group C, ages 10 to 11 years, period of eruption of bicuspids.

Group D, age 12 years; period of eruption of permanent second molars and cuspids.

The ages given, Dr. G. V. Black's averages, are used for convenience in describing certain periods in development. Modifications of the following suggestions will frequently be necessary on account of individual variation in development, supernumerary teeth, con-

13. Strang, H. W.: Disc. Dent. Cosmos, 54: 469 (April) 1912.

14. Watson, M. T.: Items Int. 37: 524 (July) 1915.

genitally missing teeth and other etiologic factors.

Group A. If malocclusion can be diagnosed in its incipiency, and treatment instituted that will prevent the eruption of teeth in abnormal positions and relations, this should be done. If children's teeth could be examined, beginning at about the age of 3 years, at intervals of three months, and all necessary operative work be properly attended to, including the restoration of the normal forms and sizes of the deciduous teeth, careful observations made regarding occlusion, and correction of any pernicious habits, it is quite probable that most deciduous teeth could be retained as useful members until the proper time for their loss, and many cases of malocclusion of the permanent teeth could be prevented.

As long as teeth are in malocclusion, the supporting tissues do not receive the normal stimulation due to normal stress of mastication, which is considered so important in the development of the alveolar process. Indeed, it seems probable that the pressure exerted by the normal movements of the mandible is largely responsible for the development of the entire lower half of the face. Dr. Thomas B. Hartzell writes:

> Occlusion of the teeth is much more apt to be normal in jaws that receive regular and vigorous exercise than in the jaws of the person who fails to give them normal activity. The bones of the base of the skull grow in conjunction with the mandible.[15]

It is quite important that all abnormal muscular habits and thumb and finger habits be corrected as early as possible. Occasionally, grinding one or more of the deciduous teeth will help to prevent malocclusion. When deciduous teeth are lost prematurely, the proper space should be maintained by the use of simple appliances, constructed so as to permit as much natural individual tooth movement as possible. Appliances are also indicated in some cases to prevent thumb and finger sucking.

In every instance, before a decision is reached relative to orthodontic treatment, full mouth roentgenograms of the case should be carefully studied.

When deciduous arches are of normal size, form and relation, orthodontic treatment is rarely necessary, although certain individual teeth may be in malrelation in one or both arches. However, in *neutroclusion* cases, in which upper or lower anterior teeth are in labioversion or linguoversion, and in *distoclusion* or *mesioclusion* cases, in which the mesiodistal arch relationship is abnormal, treatment is clearly indicated. Owing to the positive influence of the deciduous second molars on the positions assumed by the first permanent molars, it is quite important that the deciduous arches be normal in width and relation previous to the eruption of the permanent first molars.

Another type of malocclusion occasionally seen is that in which some or all of the lower deciduous teeth are in marked linguoversion and partly or sometimes entirely out of occlusion with the upper teeth. This condition should be corrected as early as possible.

The best age for orthodontic movement of deciduous teeth is the earliest at which the patient will permit such treatment, usually 3 years, and always before too much absorption of the roots has occurred, or the maximum benefit of the treatment will not result. Treatment at this age requires only a few weeks, and invariably the influence on the positions of the permanent teeth and their supporting structures is most beneficial.

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15 Hartzell, T. B.: The Philosophy Underlying the Processes of Mouth Nutrition, J.A.D.A., 11: 42 (Jan.) 1924.

Group B. When the permanent first molars erupt, they frequently do not at first assume the normal mesiodistal relationship but appear almost vertically, one above the other. Later, the lower arch may move forward into the correct mesiodistal relationship, and in so doing the upper anterior teeth are inclined labially, a step in development that is probably normal. If the permanent first molars erupt in abnormal mesiodistal relationship, or assume such malpositions soon after eruption, corrective treatment should be commenced as soon as possible, provided the roots of the deciduous incisors are still of sufficient length to insure a beneficial influence on their permanent successors. If the deciduous incisor roots are short, and the teeth loose, or if these teeth have been lost and the permanent incisors have not yet erupted, treatment should be deferred until the eruption of the permanent incisors so that the influence of the treatment may be extended to include both entire arches.

If the permanent incisors, or in fact any of the permanent teeth, begin to erupt before the loss of the corresponding deciduous teeth, the latter should be removed at once.

Lower incisors frequently erupt to the lingual of their normal positions in the arch but later appear in their correct places, without orthodontic assistance, no doubt because of normal tongue pressure. Upper incisors sometimes erupt in linguoversion, and in these cases, treatment should be applied as early as possible to make them fit to the labial of the lower teeth. The incisor teeth of both arches frequently erupt in torsoversion, and, in these cases, both arches should be widened promptly and the teeth properly placed. Widening of one or both arches is indicated before the eruption of all of the permanent incisors when it is apparent that otherwise there will not be sufficient room for these teeth. If the permanent incisors assume normal positions and the arches are too narrow to harmonize with these teeth, they should be widened without further delay. Sometimes the width of the upper arch is favorably influenced by orthodontic treatment in widening the lower arch. Naturally, the best time to widen the arches is during the period when the greatest development of this region normally occurs.

The period of the eruption of the permanent first molars and incisors is, without question, in my opinion, the most valuable time for orthodontic treatment of the majority of cases; for, if the permanent first molars and incisors are placed in normal positions at this time, many cases will require no further treatment. When we consider the length of the deciduous roots in this period, the small amount of permanent tooth development, and the possibility of securing the maximum beneficial influence on their permanent successors, it is a logical time for moving the deciduous cuspids and molars incident to widening the arches.

After treatment of the cases discussed in this group, efficient retaining appliances, requiring a minimum of mechanism and allowing a maximum of normal tooth movement, should be used, and the cases allowed to develop naturally unless further treatment is necessary.

Group C. The first bicuspids are due to erupt at the age of 10 years, and the second bicuspids at 11 years. Sometimes, the lower bicuspids appear in advance of the upper teeth and, in other cases, this order is reversed. There are many different combinations of bicuspids and deciduous molars possible on each side of the mouth. For two reasons, this is a particularly critical time in the development of the dental arches as re-

gards occlusion. One is the great discrepancy in mesiodistal widths of the deciduous molars and bicuspids, and the other is the fact that the bicuspids erupt between two areas of well developed alveolar process occupied by well developed permanent teeth. One or all of the bicuspids may possibly assume positions of malocclusion.

Malocclusion in this region should receive treatment as soon as it is recognized. It is quite important that the corresponding upper and lower bicuspid teeth on the same side of the mouth erupt at approximately the same time if normal occlusion is to result. In many cases, the extraction of a deciduous molar at the proper time will prove to be an effective measure in treatment. It is particularly important to guide the bicuspids into normal positions as they erupt; for, because of their long cusps, it is much more difficult to make the correction later.

Group D. The permanent second molars occasionally erupt in linguoversion or buccoversion. Malocclusion of these teeth should receive prompt treatment before they are so well established that normal results are impossible.

If the permanent cuspids erupt into abnormal positions, or if they are impacted or remain unerupted and the prognosis seems poor for their eruption, prompt treatment is indicated. In many cases, an upper cuspid assumes a position of labioversion, owing to the abnormal position of the root of the upper lateral incisor, which should have been placed in a normal position previously.

Early treatment seems most logical in cases of abnormally deep overbite and cases of open-bite malocclusion. In cases of supernumerary teeth and congenitally missing teeth, early diagnoses and carefully studied plans for treatment are essential.

Important points to be kept in mind when considering the proper time for orthodontic treatment are these: The final result should be the most efficient functional chewing mechanism possible for the individual. The periods of wearing orthodontic appliances and retainers should be as short as consistent with the maximum physiologic development. It is better to have two or more short treatment periods than one extended period. The teeth should have as much natural freedom of movement during the development of the dental arches as possible. It is better to assist teeth to assume their normal positions than to wait until they are firmly established in abnormal positions and then attempt to correct the deformity. As long as malocclusion exists, the tissues closely associated with the jaws are developing to harmonize with the conditions present. In some cases of abnormal arch relation, as for example, an extreme case of distoclusion, the entire lower portion of the face and anterior portion of the neck are affected.

A decision as to the correct time for orthodontic treatment is, in every individual case, a matter of judgment of the operator, based upon long experience, close observation and earnest study of growth and development, applied after careful consideration of as many as possible of the factors involved. At the same time, he will be largely guided, I believe, by the principle of early treatment, interpreted in the light of the general developmental factors mentioned above and of such special factors as may exist in the individual case.

DISCUSSION

Joseph D. Eby, New York City: A review of the literature and the programs of orthodontic meetings, in recent years, provides a ready means of gaging modern progress, and indicates the extent and trend in the evolution of this service to humanity when prop-

erly practiced. Some individuals possess a strong aptitude for grasping facts quickly, but the majority advance in knowledge, and I believe true progress in any science is likewise evolved, by constancy of association, through study, hard work and "living" one's subject at all times.

This paper clearly indicates that Dr. Baker has so lived with his subject that by experience, and investigation for the purpose of verifying the experiences of others, as well as by genius, he has assimilated the essence of the subject at hand. Again referring to the literature of modern orthodontia. I wish to submit with the foregoing opinions a statement of the fact that this is the most able rendition of this great and fundamental subject that it has been my privilege to read.

The purpose of the American Dental Association is to bring members together from all sections and all phases of professional pursuits for the purpose of discussion of principles of most vital concern and interest. It is my belief that there is no subject in the entire range of dentistry that is more truly fundamental to science or vital to humanity than this tremendously serious one before us. An hypothesis to be drawn from this paper is a consideration of the extent of the variations of opinion and practice among the specialists of orthodontia, others who are interested in its practice and the general practitioner and other specialists of dentistry of today.

It is difficult to produce an intelligent argument on this subject even among the most intelligent orthodontists without gathering differences of opinion, and the deplorable side of the question is vested in the fact that methods practiced by a large percentage of orthodontists and others are empiric and reflect a general ignorance of what the results will be with the patient. Few men seem to realize that the tissue in which we are interested is bone, and that we should be interested in it as a highly organized, viable, plastic substance that is subject to certain basic rules entirely physiologic in nature. Teeth are merely incidental factors to the great question at hand. It is true that we are interested in the positions of the teeth, that we may recognize factors that determine that they occupy certain positions, and that we may attach devices to the teeth for the purpose of moving them; and still the entire question before us is that of bone, a living constantly changing substance.

It is known that, as long as the material supply is delivered, bone will continue to proliferate to a degree and to be of a character as regards density, etc., to meet the conditions of supply and demand in the immediate locality. It is known that bone is formed into shape by the conditions of stimulation and restraint brought against it, and that so far as the growth of the bones of the face is concerned, the production of a condition recognized as normal in the adult is the result of an environment in which there has been an absence of damaging stimuli and a balance of the normal processes and functions that involve the teeth, muscles, etc. What greater service is possible than preventive treatment? What is more tragic than the hopeless condition of the adult who by the failure of intelligent direction and ignorance or disregard of the vast corrective and preventive value of early work properly done, is doomed to suffer insufficiencies, impairments, restrictions, embarrassments and injury from neglect.

I believe it is safe to state that all of denistry is vested in the serious involvements of occlusion. The progress of recent years in the perfection of anatomic instruments for the detection of the correct plane of occlusion has revealed most clearly many interesting facts concerned. The greater number of occlusion disturbances, such as the deep, impinging overbite and many other similar occlusal relations, which precede traumatic and vicious occlusions, and predispose to attrition, caries and periodontoclasia, are to be recognized between the fourth and seventh years. Many conditions of malocclusion are not apparent at this age, and require later consideration, as Dr. Baker has brought out; but this does not lessen the importance of early study and careful treatment when indicated. A great many orthodontists wait until the seventh or eighth year, when the first permanent molars are erupted, for the purpose of gaining anchorage for the attachment of appliances, and on this point centers a serious problem. If the roots of the deciduous teeth are absorbed, as between the ages of 8 and 11 years, and thereby efforts at correction cannot produce deep stimulation in the processes, the effect on the permanent dentition is either only partially beneficial, or is entirely lost by a total relapse toward original conditions, and the permanent teeth require extended treatment for correction; which indicates that the

early treatment was ill-advised in part at least.

It is believed that the prevailing practice among dentists is to wait until the permanent teeth anterior to the first permanent molars are erupted. How much better would it be to recognize and direct treatment at an earlier age when the roots of the deciduous teeth are still sufficiently long to transmit a deep influence throughout the entire maxillary processes, involving the production of normal shape and volume of bone, in which the permanent teeth are engaged, in order that the teeth may erupt correctly, or so nearly so that the serious phases of the condition will have been eliminated and such final treatment as is required later be made very simply.

Again we harken to the fact that it is the bone in which we should be primarily interested. What a wonderful thing it would be if every dentist should be correctly informed and keenly alert to recognize and direct proper treatment at the inception of the first signs of malocclusion.

I believe that a great deal of harm may be done in treatment between the ages of 8 and 12. At the same time, we must realize that, with the most intelligent care, great good is to be accomplished. The general physical condition of the child should be carefully investigated; ample roentgenographic study should be made of the deciduous teeth, and a rational interpretation be made of the findings, with treatment directed accordingly. Again, this brings out the fact that such work should be recognized and handled on the broad and sensible basis of the fact that we are dealing with a problem of growth and development, requiring a little assistance to Nature here and there, probably now and then, under the most carefully studied conditions through that period of years, until the permanent teeth are formed and in correct position.

There is a tendency on the part of those dentists who practice orthodontia to temporize with the mouth at this age; which is just as dangerous as the practice of the individual who advises waiting and allowing the complications present to increase or become destructive beyond repair.

The references to statements by Drs. McCoy, Angle, Young, Strang and others are very pertinent, and are all indispensable to the theme; but I cannot but call attention to the seriousness and the depth of thought involved in the extracts from Drs. Young and Strang. If these thoughts are read and reread and studied and restudied, and the life work of every dentist built upon them, the secret of a greater service than orthodontia merely would be found. It is a lamentable fact that too much of the practice of orthodontia is without intelligent foundation, but as surely as this is a fact, the rapid strides forward in the recognition of truth and its application are beginning to reveal their influences in the dawning of an era in which an entirely new formula for dental orthopedics will appear, and its intelligent practice will eliminate all of the questionable elements of today.

Dr. Baker has arranged on the basis of age the four groups of conditions found in the mouth, representing different governing elements in the diagnosis of malocclusion and its treatment. The arrangement of these groups and his explanation is to my mind so remarkably clear and so easily comprehended that I believe orthodontists and those interested in its practice should adopt the routine of the plan suggested as standard.

In this paper one bit of reasoning leads so surely to the next and truths are presented so free from obscurity and scientifically sound that it would be deplorable if any discussion should depart from or overshadow the object that has been so well accomplished.

Abram Hoffman, Buffalo, N. Y.: Dr. Baker has presented a timely subject for our consideration and I am quite sure there are others in this room who, like myself, have at some time or other been more or less in doubt as to the age orthodontic treatment might best be undertaken. Those of us who have been treating malocclusion for some years remember full well the swing of the pendulum from one extreme to the other. We remember when our work was delayed until maturity, with the frequent extraction of teeth, the mediocre results obtained and the accompanying discomfort. We have seen the pendulum swing even to the prenatal period for starting treatment; to the absolute contraindication of extraction and the not always satisfactory result later in life. Indeed, there must be a happy medium for the great majority of cases, and I believe that Dr. Baker, and the men he has quoted, have spoken wisely when intimating that the judgment, according to each individual case, of a thoughtful, experienced diagnostician is the key to the situation and should determine the time that treatment may best be undertaken.

In the years gone by, I found much satis-

faction in the experiments and teaching of the late Dr. E. A. Bogue. His observations have stimulated me greatly in the study of the deciduous denture, notwithstanding that I found exceptions to his deductions.

Dr. Strang's remarks are certainly logical and should be carefully considered. I feel that it is very unwise to assume that advanced or very early treatment is a panacea for all future dental ills.

The proper time for early treatment in neutroclusion cases is often perplexing and requires careful judgment, but the advisability of early treatment in mesioclusion or distoclusion is almost without question. This is especially true if we are to consider the future bone growth, development, facial balance and the like.

Dr. Baker has made reference to anomalies in number, and I remember well several instances of fairly early treatment wherein I "got my bumps" because the treatment was wrong. Roentgen rays might have helped me, but I had none, and furthermore they do not always give a clear and definite outline of all of the teeth in early life. But it would seem that roentgenograms should be resorted to more frequently than they are.

Dr. Baker says: "Sometimes the width of the upper arch is favorably influenced by orthodontic treatment in widening the lower arch." I would go a step further by adding that such influence depends very much on the type of cusps and inclined planes—if these are pronounced, the theory is very good, but the cusps of the deciduous teeth are often much worn or flat, in which case the expansion of the lower arch *only* is of questionable value. The time selected for such treatment will have to be carefully determined, if it is to be a success. Another factor that must not be lost sight of in connection with early treatment of mesioclusion or distoclusion cases, especially when the cusps of the deciduous teeth are worn or flat, is the fact that the use of intermaxillary force may cause such freedom of movement in the mandible as to result in the wearing of the cusps of the first permanent molars, thereby interfering seriously with the interlocking and restraining influences of these cusps. If they do become worn, it is often necessary to prolong treatment until such time as the bicuspids erupt, and the favorable interlocking of these cusps be taken advantage of.

The quotations from Angle and Lischer and the resolution by the Southern California Section of the Pacific Coast Society of Orthodontists should be sufficient to dispel from the mind of the dentist the fallacy of the threadbare advice, only too frequently given: "Wait until the permanent teeth have all erupted" or "Nature will take care of the case." As a rule, the time to correct any ill, or abnormality, is when it becomes manifest, the degree of treatment, or the nature of treatment, being determined by judgment based on study and experience.

Dr. Baker's grouping of cases is a valuable contribution and should enable us to speak more understandingly when we refer to "early treatment," just as the classifications of malocclusion by Angle and Lischer have brought order out of chaos.

We, as dentists, may be happy in the fact that orthodontic treatment, instituted at the correct time and carried on in the correct manner, not only results in a well alined, good looking and efficient dental apparatus, but is almost invariably reflected in the health, appearance and well-being of our little patients.

H. F. Hoffman, Denver, Colo.: As to our relation to the dental profession, how are we to interest its members in our work? How can we protect the dental profession and the orthodontist from the claims of the commercial booster? Also what is the correct age in which to start treatment in certain classes of cases? These things all work together as regards our relation to the profession and are of vast importance to our work.

William Pilcher, Petersburg, Va.: What percentage of deciduous teeth examined show malocclusion? Do not most children have good occlusion in their temporary teeth?

Dr. Baker, (closing): Regarding Dr. Pilcher's question as to the proportion of malocclusion in deciduous mouths: In my office, I see only the cases of malocclusion, but, in looking over some of the literature this summer, I noticed that some man in France, I believe, examined a thousand children in whom the deciduous teeth only were present, and in the thousand cases examined there were more than 300 cases of malocclusion, or about one in three.

THE PLACE OF AMALGAM IN DENTISTRY

By WILBERT J. SCRUTON, D.D.S., Oklahoma City, Oklahoma

(Read before the American Dental Association, Dallas, Texas, November 10-14, 1924)

I AM approaching the subject of amalgam in dentistry entirely from the standpoint of the general practitioner in whose hands the use of amalgam is not a fad, it being used when and as conditions seem to indicate.

I earnestly subscribe to the statement so often made that gold in the form indicated is the filling material par excellence, holding no brief for amalgam, contending only that it is the most sinned against of all filling materials, that in any place where amalgam can be properly inserted, a gold filling, better from the standpoint of tooth conservation, can be inserted; the cases in which the contrary is true being so rare as to be almost negligible. Amalgam is substituted because its use conserves time, money or effort.

I have examined a great many amalgam restorations, my own and those of others, and it is amazing how few present no pronounced defect. Let me be charitable and say that in employing amalgam, we were lulled by the seeming ease of manipulation into committing certain errors that could have been avoided.

Amalgam holds and must continue to hold a large place in the average dental practice, for certain conditions call for its insertion. We may reduce the number of these conditions somewhat, but cannot do away with them entirely, with our present knowledge. It is my hope that the character of amalgam restorations may be improved very materially. For the accomplishment of that object I have to offer no path of roses, no short-cut, no legerdemain, simply a restatement of the basic principles as laid down from time to time by the masters.

What proportion of the restorations on individual teeth are of amalgam?

In order to answer this question, I was prompted to place in the hands of a number of dentists a request that they make a list of the restorations applied to individual teeth in the mouths of their patients. This did not call for an enumeration of the operations of these individual dentists. That would have given an index only to the fillings that they were inserting. It called for an enumeration of the restorations as found in the mouths of patients, who come from widely separated sections of the country and from the varied walks of society. A portion of this work represents small town practice.

The compilation showed that of all restorations applied to individual teeth, including the various forms of porcelain, gold, combination porcelain and gold crowns, gold inlays and foil and the various plastics, 52.005 per cent are of amalgam. This of course is not submitted to prove either that the conditions as regards amalgam are ideal; or as an

index to the relative merits of the various filling materials. Rather, it is submitted for the purpose of bringing us face to face with conditions as they are in the rank and file of dental practices, which include the great mass of the average people who seek dental attention. I am convinced that this figure approximates closely the number of amalgam restorations as compared with the total number of individual tooth restorations: Of all restorations, as applied to individual teeth, 52 per cent are of amalgam.

The question logically following is: Why is amalgam used to such an extent? These amalgam restorations may be classified in two groups: those representing (1) the choice of the patient and (2) the choice of the dentist.

Group 1. Amalgam may be the filling material of choice to the patient because of financial reasons. It is common practice throughout the profession, owing to the difference in cost of material but more to the difference in time required to complete the restoration, to require a considerably higher fee for a gold restoration than for an amalgam. All too often this is a reason for the patient's choice, which we in all sincerity are bound to accept as final. It is not necessary to stress this. Our touch with humanity is too intimate for us not to know that there are cases in which the actual necessities of life are of more pressing moment than the difference in service between a gold and an amalgam restoration in a particular tooth. Let us not lose sight of this human side, for, to my mind, there are times when to insist on the more costly restoration is distinctly unethical. It has been roughly estimated that only 20 per cent of the dentistry that should be done is done. How much of that other 80 per cent remains undone for financial reasons, we cannot estimate. But we cannot as a part of the great healing profession leave ourselves open to the charge of caring only for the well-to-do because we insist on the more costly restorations.

Amalgam may be the filling material of choice to the patient because of lack of knowledge as to the comparative merits of the different filling materials. In the minds of many of the laity "Will it show?" is the criterion by which to decide the material to be used. Have you ever been asked that question? "If it shows, use gold, if it does not show, use amalgam," with the thought implied that, aside from the appearance, the one is as good as the other. This test is just as faulty, of course, as the other extreme, which apparently is suggesting itself to the mind of the public, that a gold restoration is good because it is of gold; that an amalgam restoration is indifferent, or at best fair, because it is of amalgam.

Group 2. Amalgam may be the restoration of choice of the operator when it answers the question "what is the best filling that I can insert in this particular cavity?" These cases form but a small percentage of those requiring restorations. Possibly of such are cavities occurring in the gingival third, especially those extending more or less rootwise to the line of normal gum attachment, buccal or lingual of the molars. We find cases in which the decay in the last tooth remaining posteriorly has invaded the tooth structure in the gingival third buccally or lingually extending around onto the distal surface. Conditions are often such in these cases that the insertion of any form of filling under ideal conditions is impossible. In such cases, amalgam would be considered the filling material of choice by the operator, as also in cases in which the crown of the tooth is badly broken down

and it is desired to support the parts remaining and build up the tooth for the reception of some form of permanent restoration.

Amalgam may be the filling material of choice of the operator in cases in which the physical condition of the patient requires the expenditure of the minimum of vitality. With the minimum of effort on the part of the operator, with the minimum of strain on the patient from cavity preparation and insertion, amalgam may be inserted that may render service for years.

Amalgam may be the filling material of choice of the operator owing to the exigencies of a crowded practice. The question sometimes arises "How can I restore the function in this particular case with the least expenditure of time?" The objection may be raised that the element of time required should not enter into the selection of the filling material. From the standpoint of the idealist, that is correct. Yet there are occasions when the element of time must be given consideration; when the *vis a tergo* forces the operator to make certain restorations within a certain time limit; when to devote an excess of time to one entails the neglect of another; when it cannot be the academic question "How can I best serve this particular case?" but rather the question "How can I do the greatest good to the greatest number?" With the present ratio existing between the number in the dental profession and the population at large, this question must be more and more given recognition. We will not be held guiltless before the bar if we erect barriers in the form of intensive, more and more time-consuming and hence increasingly expensive methods, limiting thereby our ministrations to the few, and unable to serve the many.

In the army, there was a daily occurring picture of men in uniform, in line, awaiting dental attention. A number of cavities were prepared, some occlusal, some two and three surface cavities. Possibly two matrices were adjusted in the same mouth and the fillings inserted. While the fillings were reaching a stage at which the removal of the matrices was indicated, occlusal cavities were filled. Men sat about on benches with matrices in place, the time of the initial setting of the amalgam being utilized by the operator in inserting other fillings. True, these are extreme cases, not ideal, and not to be emulated. But they are illustrative. And so amalgam may be the filling material of choice by the operator in a crowded practice in order to conserve time; for there is no filling material known today that with so little expenditure of time will yield such large returns in tooth conservation.

Amalgam is inserted largely because of the reasons given. I am convinced that the dental profession could decrease the proportion of amalgam restorations inserted by a clear, concise statement of the advantages of gold; that we are inserting many amalgam restorations when an educational talk would lead the patient to choose a gold restoration. Rather than enter into a discussion of the relative merits and cost of the two filling materials, too often the line of least resistance is chosen, and amalgam is inserted.

The next question naturally is "In what condition do we find these restorations?"

In order to answer this question, I examined *in situ* 150 amalgam fillings that had given from one to twenty-four years of service, keeping in mind (1) external cavity form, (2) occlusal restoration, (3) contact, (4) restoration of interproximal space, and (5) margins. It is recognized that 150 is not a sufficient

number upon which to base a final judgment, so that the grading was necessarily arbitrary. It represented but one dentist's point of view, howbeit with an effort to be judicial. Some of the work was my own. Of these 150, fourteen, or 10 per cent in round numbers, were graded as good, thirty-one, or 20 per cent as fair, and 105, or 70 per cent as poor. Without a discussion of these restorations individually, you, I am sure, have in mind the picture which they presented in the aggregate—disregard of the principle of extension of cavity walls to areas of relative immunity from decay; occlusal surfaces flat; contact either a plane surface or a line instead of a point; margins in the form of a groove, with the exception of the gingival, where an overhanging mass was more or less pronounced, with the consequent encroachment on the interproximal space.

Approximately, 10 per cent were good, 20 per cent fair and 70 per cent poor, judged on the five points mentioned. I removed a number of the fillings graded as poor for the purpose of noting the degree of protection afforded against recurrent decay by even poor amalgam restorations. Decay, of course, does take place beneath the amalgam. A discoloration that is often mistaken for decay is common. But it would seem that the discoloration, the result possibly of a chemical process, has an inhibitory action on the factors entering into decay. The tooth structure beneath those stains as a rule seemed firm and unaffected.

Wherein lies the cause of this unfavorable showing? The grading of the restorations just discussed was based upon external cavity form, occlusal restoration, contact, restoration or preservation of the interproximal space, all four of which headings check directly back to the operator. The condition of the margins may be due to the amalgam itself, though the fact that some restorations presented good margins leads us to believe that all would have had good margins had all received the same care in technic.

Amalgam is in disrepute. It is banned from some offices altogether. And this not because of insurmountable difficulties in the technic of its manipulation, not because of weaknesses inherent in amalgam, but because we have not been inserting amalgam according to the best teaching. That it is in disrepute is not so much an indictment against amalgam as an indictment against our profession. It is condemned because of the failures without asking wherein the cause of those failures lie. We look at a group of amalgam fillings. They give a disreputable appearance. And we condemn amalgam sweepingly when those fillings were doomed to failure from the moment of their insertion. We expected them to be workers of miracles. Gold foil inserted with a like disregard of the successive steps for its proper insertion would also be a failure. May I suggest that the most potent cause of faulty amalgam restorations is that we are not sufficiently interested in amalgam? Fifty-two per cent of all restorations on individual teeth are of amalgam. Are we 52 per cent interested in amalgam? Does it hold the place in our clinics, our demonstrations, our round-table discussions that its place in the actual practice of dentistry justifies? I examined 27,941 pages of current dental literature and found that gold inlays received 331 pages of recognition, porcelain jacket crowns, 251 pages, amalgam, 186 pages, and alveolectomy, under its various names and modifications, 136 pages.

It is a too commonplace and everyday operation to grasp and hold attention and yet I know of no way in which more improvement in dentistry, benefiting more

people, may be made than in the improvement of amalgam technic. Certain eminently qualified investigators to whom I would pay homage, with the aid of extremely delicate apparatus have made us familiar with the physical properties of amalgam and the dimensional changes which it undergoes. They have made available on the market, high grade, standard alloys. They have made clear that some alloys also on the market are inferior. It may be that some day an extension of present law will protect dentist and patient alike from these inferior alloys, so that we may know with certitude the essentials of the alloy we purchase.

Finally, how shall we insert amalgam restorations offering greater hope of permanency?

There is no claim to originality in this method here offered. Ideas have been gathered from lectures, discussions, articles and conversations and gradually added from time to time in the hope of correcting evidences of failures appearing in my own work, a groping now here, now there for better results. It is in a way a product of evolution. I do not know whom to thank for the good points it may possibly contain, whom to criticize for the bad features which it also may contain. Nor shall I promise that it will undergo no change in the future.

In any technic employing amalgam, it is well to remember that, in the vast majority of cases, amalgam is a substitute for gold, substituted to conserve time or money, and any method so elaborate as to require too great an expenditure of time defeats the very purpose which it is designed to answer. Also that a too extensive or unusual armamentarium, too great a variety of instruments, will not commend itself to general favor.

TECHNIC

Cavity Preparation.—Standard cavity preparation is employed, with slight retention along pulpal and axial walls. This need not be so pronounced as to weaken the walls of the tooth structure. The axiopulpal angle should be slightly rounded, giving width and depth necessary to prevent the fracture of the filling under stress of mastication at the union of the occlusal and proximal portions of the filling. The cavity margins should be beveled as closely as possible, following the long axis of the enamel rods and dropping abruptly into depth of cavity. The preparation of cavities for the reception of gold inlays has, I believe, in this particular worked to the detriment of our cavity preparation for amalgams. The edge strength of gold has led in some cases to an extreme beveling of the margins of the cavity walls, these walls to be later covered and protected by the attenuated inlay margins. To my mind, this practice is fraught with danger in cavity preparation for the reception of amalgam. Such thin margins, owing to lesser degree of edge strength, will fracture under stress and leave the grooves we so often see about amalgam fillings. While in the plastic state, amalgam may be beautifully molded into these thin margins. Under stress of time, these thin margins will fracture. They should drop as abruptly as the histologic structure of the tooth will permit into depth of cavity.

Preparation of Amalgam.—My preference is a high-grade medium setting alloy. A set of balances is used to secure the relative amount of mercury and alloy advised by the manufacturer. In case experience proves that this proportion gives a mix too dry to allow time or facility in packing, a little excess mercury may be added. A mortar and pestle are used, with a firm grinding motion, to bring the mercury into intimate contact with the alloy. No effort has been spared up to this point to keep both mercury and alloy uncontaminated.

There are few hands so free from moisture or débris that the grinding action of the particles of alloy will not pick up foreign matter and interfere with amalgamation. Why take this chance? Research has shown that the strength of amalgam increases rapidly and the dimensional changes are hastened as the time of trituration of alloy and mercury is increased, up to three minutes, with a diminished rate of increase above that point. But as we must allow time for the insertion of the amalgam in the cavity and as the actual process of packing is a continuation of the trituration, three minutes is determined on as the time of trituration. In two and three surface cavities, the mix is mulled in the hand by an assistant during the progress of packing in order to keep it in a plastic state, the stage when the moisture from the hand might seriously interfere with amalgamation having passed.

Insertion of the Filling.—In cases of proximoclusal cavities, when time permits, separation is obtained by packing the cavity with guttapercha, in an amount slightly in excess of that necessary to fill the cavity. The stress exerted by the opposing teeth will secure separation. In cases in which immediate filling of proximoclusal cavities is required, reliance is placed on the firm packing of the amalgam to secure the required separation. If a thin matrix band is used, and if it has not been drawn too tightly about the tooth to be restored, sufficient separation to restore normal contact will be obtained.

A matrix is used in all two and three surface cavities, a No. 1 in case of the former, a No. 8 in case of the latter. They are quickly and easily adjusted and removed. This is necessary to permit of the firm packing of the amalgam and to preserve the interproximal space. As a further aid in this direction, the matrix should be held firmly against the gingival margin of the cavity, by a wooden wedge. Cotton rolls are now put in place to keep the cavity dry. I do not use a rubber dam while inserting amalgam. The cavity is cleaned with alcohol and dried. The amalgam is ready for insertion. It is inserted in small pieces to guard against voids, packed with as firm hand pressure against the walls and floor of the cavity as can be exerted in the mouth, the larger end of double ended amalgam plugger being employed. The small end of the plugger is then stepped rapidly along the walls of the cavity and the matrix. The point to be emphasized is the angle formed by the matrix and the tooth structure. The small end of the plugger has been ground to fit into this angle with relative precision. Firm, positive pressure is exerted in these angles, which are later to form the margins of the filling. Herein lies one of the causes of the failures of margins in amalgam restorations. The condensing instrument has not been carried definitely into these angles, and hence the amalgam forming the margins has not been subjected to the requisite packing pressure.

Piece by piece the amalgam is added, the operator going systematically over the whole surface with the plugger, giving definite attention to the angles formed by the matrix band and the tooth structure until the cavity is overfilled. The thumb or finger is placed on the filling, strong pressure being exerted in rolling the thumb toward the matrix, the excess mercury being expressed in that way. This is repeated until as much mercury has been removed as possible. The matrix is left in place from twenty to twenty-five minutes.

Finishing.—Any excess on buccal or lingual and gingival margins is trimmed oft with sharp instruments or fine disks, encroachment on the interproximal space or the lingual or buccal embrasures being

carefully avoided. For trimming away excess on the occlusal and for restoring the occlusal form, round burs Nos. 7 and 11 are employed.

At a later sitting, the usual method of polishing is followed, especial care being exercised that no small overhanging masses of amalgam be left. If overhanging amalgam is left, sooner or later it will fracture away, leaving unsightly and vulnerable margins. I have seen amalgam restorations which seemed to have raised up out of the cavities owing to the fact that thin edges of amalgam had been left extending out onto the enamel surface, and these edges had broken off on all sides.

CONCLUSION

The most common weakness of amalgam restorations is apparent in the margins. This can be largely overcome (1) in cavity preparation, by dropping into depth of cavity as rapidly as the histologic structure of the tooth will permit, thus avoiding thin attenuated margins; (2) in insertion, by packing carefully and forcefully the amalgam in the angles which will be the margins of the finished filling, and (3) in the final finishing by making sure that the amalgam does not extend onto the tooth surface.

DISCUSSION

William E. Harper, Chicago, Ill.: I shall confine my discussion more particularly to those phases with which I feel familiar because of my experience in clinic and laboratory test work. Dr. Scruton correctly states that amalgam is the most extensively used, the most sinned against of all filling materials, and the least studied and written about. The reason we have been able to use amalgam so carelessly and without knowledge of its technical requirements and "get away with it," is because most amalgams possess germicidal power sufficient to inhibit or stop decay. Consequently, the teeth are saved, and incidently our reputations, notwithstanding a badly discolored tooth. The germicidal power of amalgam makes it possible for the unskilled or careless operator to do a great deal of work with the minimum expenditure of time, effort and skill and win the confidence of the patient by the low fee charged. From 1908 to 1914, I gathered a record of more than 1,200 amalgam test fillings made by myself and other operators, and found that over 95 per cent leaked as soon as exposed to air pressure from within. Today, I can show a record of 95 per cent of permanently nonleaking fillings, at pressures ranging from 5 to 30 pounds. When high grade dental alloys are used, almost all of the leaking fillings are the result of operative faults, not shrinkage and expansion. To state the fact in another way: the fault lies in the operator, not in the material. We know less about how to use the dependable dental alloys than we know of the use of all other filling materials combined. To dispute these statements successfully, it is necessary to examine the character of the adaptation against the inner walls of a cavity, and to measure the results accurately by means of the air pressure test, the only known test for adaptation. When proper means are provided for observation, more than half of the test fillings are sufficiently defective that their condition is apparent to the naked eye; and the smaller defects are revealed by the searching power of the air pressure test applied from within. With these generally observed faults, why is amalgam used to such an extent? Because, as Dr. Scruton says, there is no filling material known today that, with so little expenditure of time, and I would add skill, will yield so large a return in tooth conservation. Dr. Scruton calls attention to the fact that amalgam is in disrepute. It is banned from some offices; and not because of unsurmountable difficulties in the technic of its manipulation, nor because of weaknessess inherent in amalgam, but because we have not been inserting amalgam according to the best teaching. That it is in disrepute is not so much an indictment against amalgam as an indictment against the profession. Since the year 1914, we have had at our disposal a proved, practical and successful technic for employing amalgam, by which we can make uniformly perfect, nonleaking amalgam fillings. With the correction of this general fault, leakage, I believe that, as Dr. Scruton says, there is no way in which more improvement in dentistry, benefiting more people, can be made than in the improvement of our technic in the use of amalgam. My plea is for a better knowledge of the operative requirements and the exercise of more care in every detail of the work. Amalgam work should be given the same cavity

preparation as gold work, except that we may omit convenience form, and we do not need to bevel the margins except to insure full length enamel rods. All amalgam work should be done with high grade dental alloys. An ordinary plastic mix of a quick setting alloy becomes insufficiently plastic to be packed into perfect adaptation in three minutes. A decidedly plastic mix will retain its necessary plasticity five minutes if the excess mercury is allowed to remain in the mass, to be expressed during the packing. Because of the short operating time, quick setting alloys are much more difficult to pack into perfect adaptation than the medium setting alloys. For this reason, quick setting alloys cannot be dependably used except in the hands of rapid and skilled operators. Medium setting alloys remain sufficiently plastic to be adapted to cavity walls for from six to fifteen minutes. Average and slow operators must use medium setting alloys in all average large and proximoclusal cavities. Slow operators may safely use quick setting alloys for small and shallow simple cavities. Quick setting alloys are much more difficult to use successfully, and there is only one important reason for their use: We can save from one-third to one-half the time required to complete the filling as compared with the time required when medium setting alloys are used. The following operating details require special emphasis: Operators should always make the mix with an excess of mercury. Much better results are obtained by this procedure than are obtained by adding mercury from time to time during the mixing process. For filling large and proximoclusal cavities with a quick setting alloy, it is imperative that the plasticity be sufficiently great to provide enough time to permit packing the amalgam against the cavity walls before creaking or crepitus develops in the mass. A smaller degree of plasticity is required in the use of a medium setting alloy. Insufficient plasticity accounts for more than 60 per cent of leaking amalgam fillings observed; faults that have been erroneously attributed to shrinkage and expansion. Tamping, a light tapping with the plugger, eliminates from 10 to 15 per cent of the faults in adaptation that would otherwise occur; also, a well tamped filling requires much less forcible packing in order to remove the excess mercury and to pack the filling into adaptation. This makes tamping of special importance to the majority of operators, because they have not acquired the power to pack amalgam with sufficient force. The packing procedure of most operators is sadly deficient. Operators fail to pack with sufficient completeness and generally pack unequally. This fault can be avoided only by an orderly stepping in one direction of the plugger. Less than 20 per cent of operators pack amalgam with sufficient force to remove the unattached tin and excess mercury. The profession has failed to grasp the importance of stepping the cavity walls, which is the finishing packing detail applied to each piece of amalgam added. Forcibly stepping the cavity walls with the smallest plugger locates small voids and imperfections, and the use of a small plugger insures the maximum force with which we can penetrate to the depth of the fault and be sure of its complete removal around the full extent of the cavity walls and margins. When one or more of the surrounding cavity walls is missing, it must be restored by the use of a matrix; and the matrix should be wedged into immediate contact with the gingival margin to avoid any overlapping. Overlaps require much time for their complete removal, and it will be found much easier to avoid making them by the use of a toothpick wedge. When amalgam is used to adjust one's services to meet the reduced financial circumstances of the patient, I find it necessary to use a quick setting alloy, and complete the filling at the one sitting. Amalgam fillings can be given a burnished finish at the one sitting that will make the filling less conspicuous and insure its remaining as clean as when polished. It has been my experience that the use of a medium setting alloy, and a second sitting for the polishing of an amalgam filling in an average sized proximoclusal cavity, requires as much time as that taken for a gold inlay, which in many instances might better be used. If time cannot be saved, the material cost does not justify the use of amalgam when gold is indicated.

J. D. Patterson, Kansas City, Mo.: We agree with the essayist when he says: "Amalgam holds and must continue to hold a large place in the average dental practice." We also agree with the reasons enumerated for such practice. We agree that faults of amalgam are usually faults in manipulation. We agree with the directions in cavity form for amalgam and with the method advised for form and finishing. We do not agree with all the advice given to make amalgam in dentistry bettery. My criticism of Dr. Scruton's directions concerns chiefly the preparation of the alloy for insertion in the cavity, the use of an excess of mercury, and the mixing methods. I believe that the prevailing methods of mixing and inserting, which are

those advised by Dr. Scruton, are not the scientific methods, which lead to the most desired results. I believe that when amalgam is treated right, there is only one objection to it and that is its color. All other objections that have been urged, such as shrinkage, expansion, spheroiding, crevasing, flow, discoloration of teeth and discoloration of filling, can be practically eliminated, except discoloration of filling, if the following rules are observed: 1. Use a standard amalgam. A standard alloy is a ternary, quartenary or tetranary compound. A binary alloy of tin and silver is never dependable. 2. Weigh the filling and mercury. A variable or excessive amount of mercury makes a filling that will exhibit one or the other of the faults mentioned. The amount of mercury required is that which will make a perfectly homogeneous mass when placed in the cavity under strong pressure. There must be no mercury to be expressed if the best results are desired. The proportion of mercury and filings usually required is one of mercury to three of the filings by weight. 3. Mix the filling and mercury by vigorously shaking in a mixing or test tube. Each particle of filling is thus covered with mercury, and primal and final amalgamation is made in inserting in the cavity under strong pressure. Prior to insertion, the mass, for easier handling, is made into ingots in a mold. The use of a mallet is strongly advised, a buffer being employed under the plugger point. The proportions of mercury and filling advised by Dr. Scruton are the proportions given by the manufacturer. These proportions all have an excess of mercury, sometimes more, sometimes less, but always an excess mercury to be expressed in some part of the process. This seems to me to be the chief error in amalgam work. The makers of amalgam, in recommending an excess of mercury, make a concession to the user, who thus finds manipulation easier, for the maker of amalgam is well aware that a perfectly homogeneous mass without excess mercury is what his carefully compounded ingot from which the fillings are made should be. Makers of amalgam consent to this statement, and are aware that the expressed mercury always contains uncertain and variable amounts of the ingredients, thus jeopardizing the behavior of what remains. The grinding of the filling and mercury in a mortar and manipulation in the palm of the hand may do for a potential model, but does not appeal for perfection in a filling in a tooth. Amalgam treated as I have described, when placed in a cavity—whether in a tooth or an experimental cavity—"lies dead." Change of any sort is entirely negligible. The foregoing rules are not new, and are not original. They were promulgated in the early seventies by Thomas Fletcher of Warrington, England, Brownlie, and other English scientists of London, and developed by Dr. Thomas B. Hitchcock of Boston and Dr. E. A. Bogue of New York. The long series of experiments and their conclusions were published in the *British Journal of Dental Science* from 1870 to 1875. The detailed account, entitled "Dental Metallurgy," appeared in book form by Thomas Fletcher. In the early part of Dr. Scruton's paper is the following statement: "In any place where amalgam can be properly inserted, a gold filling, better from the standpoint of tooth conservation, can be inserted." I cannot agree with this. Amalgam is a poor conductor of thermal changes and vastly less inimical to pulp life than is gold. Its use also conserves tooth structure; therefore, when conservation of a tooth is concerned, amalgam may—chiefly for the reasons given—have precedence over gold if the amalgam is treated in the best manner possible. There are other reasons why amalgam in dentistry is entitled to a place, but they have been so ably set forth by Dr. Scruton that they will be sure of your attention. My whole desire in this discussion is to call attention to what I consider the chief error in amalgam manipulation: the use of variable and excessive amounts of mercury in combining the ingredients. I thoroughly believe that the weak points commonly ascribed to amalgam are due to this error, and are not inherent in the material itself. To quote from the "American System of Dentistry (1886):"

"Amalgam has been utilized as a filling material for over one hundred years. Some of its advocates have regarded it as a 'special providence' while others have claimed it is only used by imbeciles. In short, it has been credited with defects and qualities which would at once indicate that it is the worst and best material in existence for filling teeth. However, it is with its defects the most endurable plastic that the inventive skill of the profession has produced, and brings a filling material to those who otherwise could not avail themselves of the benefits."

Dr. Scruton (closing): Dr. Harper and Dr. Patterson have grown old in the service in experience and experiment, and we who are younger in the profession must listen to them with a great deal of respect. I do not assume in any way to have a superlative knowledge of amalgam. I did not pretend to present a complete and definite technic but simply to cover the subject of the place of amalgam in dentistry.

SIMPLE TECHNIC TO OBTAIN MAXIMUM RETENTION AND STABILITY IN LOWER IMPRESSIONS

By F. M. HIGHT, D.D.S., Houston, Texas

(Read before the American Dental Association, Dallas, Texas, Nov. 10-14, 1924)

THE method here presented, which can be used with a little practice by any dentist, demands a modified compound technic. Its employment will, I believe, enable the majority of operators to secure better results, more easily and quickly, and with less liability to inaccuracies. My indebtedness to leaders in the profession for the fundamental principles involved in this technic, a modification of that taught by Dr. Russell W. Tench, of New York City, will be so obvious that I feel it hardly necessary to give references.

Compound is a material that can be mastered and used by all, notwithstanding the statement frequently made that its employment is for the experts only and is not teachable. It is my observation that those men who use a modern compound technic are believers in retention for lower dentures. They know that the so-called suction is obtained, not by compression of the tissue, which lessens the blood supply, but by the proper sized base and the exact placing of the periphery against movable tissue.

The first consideration in obtaining this retention and stability is the outline or area to be covered by the denture. This area, on the labial and buccal margins, is governed by the lip and cheek tissue attachment; on the lingual margin, by the floating tissue and post molar space; on the posterior, by the retromolar triangle or soft tissue. The valve seal is formed by the extreme periphery of the denture coming in contact with movable tissue, and not by pressure to the sides of the ridge.

Maintaining retention depends largely on the absence of a pathologic condition and the presence of a smooth, gliding, balanced occlusion.

By maximum retention, I mean that retention which can be obtained in a given case without resorting to the compression of tissue. We should not expect to obtain the same degree of retention in the unfavorable case that we obtain in the favorable.

As soon as we realize that the best possible impression can be no other than a counter die of the conditions present, we shall cease to look for something in the way of a miracle that would insure the making of all lower dentures uniformly successful.

Every denture-wearing patient desires a lower denture that is stable at all times. Frequently, we hear the question, "Can you fit my lower mouth?" As though a fit would result in a successful denture. The question should be, "Can you make a lower denture that will function and be successful with my present mouth condition?"

I am a great believer in a classifica-

tion of favorable and unfavorable mouth conditions, because, without the ability to classify conditions, one is unable to examine a mouth and foresee the final results, which, according to their importance are: (1) shape; (2) tissue condition; (3) ridge relations; (4) size.

The first in importance is shape. The ideal shape is the one presenting a half round ridge surface from the labial and buccal to the lingual margins. These cases do not present tissue attachments near the crest of the ridge, but by their shape tend to lessen the lateral movement of the denture.

The second, tissue condition, refers to the thickness or resiliency of the soft tissue covering the ridge, especially that in the retromolar triangle area, or what is commonly known as the heel. The thicker this tissue covering the ridges, the less irritation from the denture. Irritation, as we are aware, causes the loss of osseous tissue.

The third, ridge relation, refers to the relation of the lower ridge to the upper. The ideal case is one in which the crest of the lower ridge is about 8 mm. below and slightly lingual to the upper occlusal plane. This relation permits the force of mastication to be directed through the center of the ridge. When this relation is abnormal or is greatly increased, as we find it when there has been much absorption, the efficiency of the denture will vary directly in proportion to the amount of leverage.

The fourth, size, is a factor of comparison only, since a smaller jaw can present ideal conditions, which should show as favorable a degree of retention and stability as the larger.

There are, of course, other factors that enter into the unfavorable conditions, such as thick saliva and an overdeveloped tongue. The most unfavorable are those presenting sharp narrow ridges, thin tissue attachments near the crest of the ridge, and also those cases which, as a result of absorption, have developed flat, narrow ridges, the distance from the occlusal surface of the upper teeth being increased thereby.

On account of the variations in the soft structures of the mouth, ordinarily it is not wise for an operator to restrict himself to a single material for impression making; but each operator, for the case at hand, must employ the material that, in his hand, yields the best results in securing maximum retention. In making his selection of materials for this purpose, he must take into consideration a classification of the soft structures, as to mobility, resiliency and density. It is obvious that a material with the working qualities of modeling compound must be used in every mouth to secure the outline of the impression. However, in cases that present areas of marked mobility along the crest of the ridge the use of plaster in conjunction with modeling compound, which will have the least tendency to displace this movable tissue, is indicated. In all other instances, the use of modeling compound alone is indicated.

TECHNIC

The first step is the snap impression. In making this, the operator should avail himself of as great an area as possible, especially in extending it well up on the ramus.

The next step is to pour a cast with the use of plaster, which is to serve in the preparation of an individual impression tray. This impression tray not only provides the tray but serves as impression material as well. A tray long enough to reach to the heels is adapted to the cast by cutting away the labial and lingual flanges of the anterior portion and flattening it in the bicuspid and molar region. This tray is laid aside

while, with the hands, a mass of modeling compound is molded to the cast, precaution being taken to have it at least one-fourth inch in thickness. It is then chilled.

The metal tray is now heated over a Bunsen flame and pressed into this block impression, which has been made with the hands in order to reinforce the block. With the use of a sharp knife, the block impression is trimmed to approximately the outline of the finished denture.

With the exception of the snap impression, all of this work, up to the present time, has been done in the laboratory, the operator being left free at the chair.

We are now ready for the final impression. The impression block is chilled in ice water and the excess water is shaken off. With the use of a Tench mouth blowpipe, the inner surface is softened to a depth of approximately one-eighth inch. It is then dipped momentarily into water at a temperature of 140 F; and immediately inserted and pressed into position with the fingers of both hands, the pressure being equalized on both sides as nearly as possible. While the pressure is lightly maintained, the mouth is flooded with ice water in order thoroughly to chill the impression before removing. As soon as it is removed, it is immersed in ice water to continue the chilling process. The excess material is trimmed away, and then the impression is returned to the mouth to test retention. In many instances, the retention at the heels will be insufficient, and compound may be added with a tracing stick to secure better adaptation; dipped in hot water to temper as before, and inserted with light pressure for the purpose of giving an approximate shape. This is then removed and chilled. The added portion is now heated with the blowpipe, tempered and inserted, care being taken to seat the opposite side first; but finally to equalize the pressure in the same manner as when making the whole impression. It is then chilled and removed, and any excess is trimmed off.

If necessary, the other heel is corrected in like manner, and a similar procedure is followed at any other point where the seal needs to be strengthened.

Now we are ready to trim the impression for muscle action. This is done with a sharp knife, the length of the flanges being determined by the height of the tissue attachments, the operator availing himself throughout of his knowledge of the anatomic structures involved. For this purpose, the impression is trimmed a section at a time, and then returned to the mouth to make sure that the retention of this section has been maintained before another section is trimmed. In case it is required, any section may be corrected with the use of the tracing stick, as has been indicated. Should plaster be indicated for the case, we now scrape out the impression of the crest of the ridge and also of movable tissue that has been unduly compressed. The impression is then completed, a recognized plaster technic being followed.

CONCLUSION AND SUMMARY

The advantages of a compound impression may be summed up as follows:

A comparison can be made of the stability and retention of the impression with that of the finished denture.

The border can be readapted at any point after the impression is tested for the valve seal.

Soft tissue can be displaced along the borders when necessary. In many cases, this is advisable.

The exact length and thickness of the periphery can be checked in the impression, the operator thereby having less

trimming to do later in the finished denture.

The impression can be obtained under a slight pressure, which is advisable in many cases, and will help in securing balanced occlusion by assuring a better seating of the base.

The technic can be easily acquired as it does not require a great deal of skill.

This method requires but slight tracing of compound and forms the valve seal by contact of the margin of the denture with the movable tissue.

The time required should not exceed twenty-five minutes for the one jaw.

The patient is not required to assist in taking the impression.

An impression can be obtained as satisfactorily by fingers trained to equalize the pressure as by the closed mouth technic.

Owing to the fact that the outside of the impression is cold at all times, it may be placed more easily in position in the mouth.

Muscle trimming can be done better in compound with a sharp knife, instead of by heating and using the tissue, because every denture should be worn longer than the extreme movements of the cheek tissue demands. The latter method has the danger of pulling the compound away from the sides of the ridge, thereby effecting the adaptation.

DISCUSSION

B. L. McCoy, Dallas, Texas: As I employ the technic described, as given to me by Dr. Hight three years ago, I shall speak on the points that I consider most vital.

Is retention, or so-called suction, desirable in a lower denture? And, if so, will it be of sufficient duration to justify our efforts to obtain it? I believe that it is highly desirable, and one of the greatest factors in the quick mastery by the patient in wearing a lower denture. As to the duration of this retention in a given case, it is my experience that this is maintained over a much longer period than we have heretofore been led to believe was possible; this depending largely on a balanced occlusion. I have dentures inserted three years ago showing almost, if not quite, as much retention as when inserted. But, contrary to the belief of many of my friends in practice, I believe retention a valuable asset though it might last only over a period of a few months. After twenty years in practice, using various materials, and combinations of materials, according to various technics, I am able by this technic to get a better impression, in less time, than ever before. The impression being correctable, there is never a doubt as to the fit of the finished denture, unless there be a break in technic. I agree that the limiting of oneself to any one material for impressions is an error, but that the case at hand determines what one should use. I seldom use compound and plaster in conjunction, preferring all plaster where plaster is at all indicated; and using a tray conforming to the conditions as found. I have never found a case favorable for retention in which plaster would approximate compound in obtaining it, except when the ridges were high and the retention obtained by frictional contact against high ridges and proper extension over the molar eminences.

In this connection, I think the essayist has not put sufficient stress on the importance of the extension of the impression in the retromolar triangle area. Failure to secure the maximum retention possible will be, in 95 per cent of cases, due to underextension in this area. Because less resorption takes place at this point than at any other on the lower ridge, and as the ridge resorbs the denture gradually moves forward, it follows that shortening of the denture at this point will ultimately mean the moving of the base from its best point of retention; and it is not uncommon to see dentures from one-half to three-fourths inch too short. The proper classification of mouth conditions is the most vital step in denture construction. Without it, there cannot be a knowledge of the anatomy of the case, and it is on this knowledge alone that we depend in outlining our denture. Proper outline, equalized pressure and an absence of excessive peripheral bearing are easy of attainment by this method. The most difficult of these is the proper outline, which is obtained by a digital as well as an ocular examination as to the relation of impression to the tissue, based upon the anatomy of the tissues involved, and this difficulty is easily

overcome by making a more careful survey and classification of the favorable and unfavorable conditions found in all cases.

Arthur E. Kruse, Houston, Texas: The major part of my work consists in making dentures. I took several postgraduate courses in this work, and had developed a technic that I considered good. About this time, I met Dr. Hight, who was kind enough to demonstrate to me his technic and show me a number of his cases. I saw a man getting results that I had never thought possible. I shall endeavor to impress on those of you who are not getting ideal results for the case at hand, in the making of lower plates, the great amount of good that may be derived by familiarizing oneself with this technic, and putting it into practice. This technic is the essence of simplicity. It is so understandable that, after seeing Dr. Hight's clinic and with very little practice, one can secure suction and stability thought impossible of attainment in lower plates. I do not mean that there will be uniform suction in all cases, but one can get the maximum retention for the case at hand. By this, I mean that, through proper classification of mouths, the operator will not expect, as I once did, to get the same degree of retention for all cases. Personally, I am satisfied now with a lesser degree of stability and suction for the mouths that present unfavorable conditions, for I can see that, with these conditions present, it is impossible to obtain results that may be expected in the ideal cases. To begin with, Dr. Hight not only tells us the value of mouth classification, but clearly tells us how to classify mouths. It is a matter of great satisfaction to be able to classify a mouth, so that one can, before beginning a denture, be able to say approximately what amount of stability and suction he will be able to obtain. More than this, it is very important that the patient be told what he may expect. In most cases, this will save much embarrassment later. The successful wearing of dentures does not depend altogether on ideal mouth conditions, but more on the determination of the patient to wear them. The latter means more than 50 per cent in the success of the case. Practically all of us, I am sure, would much prefer to make dentures for a patient who has a determination to wear them and with unfavorable conditions, than for one of whom the reverse is true. The order in which the essayist named the important factors in the classification of mouths is correct. Shape is by far the most important factor. I have noticed that many essayists make the assertion that size is the most important factor. I venture to say that if you were called on to choose between two mouths, one large and with a flat, ill-shaped ridge, the other small and with an ideal half-round shaped ridge, the greater majority of you would immediately classify the latter as being the more favorable, provided all other factors were the same in both mouths.

Some of the difficulties I have encountered in using this technic will demonstrate that it is not absolutely fool proof. First of all, I have had some trouble in getting the modeling compound block into small mouths and seating it properly. This I have overcome by reducing the thickness of the block. In going into the mouth with the block, the operator should first insert one side, holding the other side of the mouth out with a mouth mirror, and then rotate to place. A little lubricant rubbed on the lips will facilitate the gliding of the block over the lips. Another difficulty I had lies in the fact that I had to reheat the surface of the block too often before I could get a uniformly smooth impression of the ridge. Sometimes I heated it as many as eight or ten times before beginning my tracing at the heels. Two or three times should have sufficed. I know now that this difficulty came partly from my failure to adapt the modeling compound smoothly to the plaster cast, and also from my inexperience in handling it. After modeling compound is worked for some time, its manipulation becomes much easier. During cooling, after the block has been adapted, considerable shrinkage away from the cast takes place. This can be overcome by gradually warming it in moderately warm water, and then springing it back to place on the cast and chilling there. If the block cannot be removed from the cast on account of undercuts, they should be chipped off with a knife.

My greatest difficulty has been overextension, which necessitated a number of visits back to the office by the patient in order to get relief from a number of sore places along the periphery of the ridge both inside and outside. By trimming, I have found that the suction would improve, which makes it clear to me that I was overextending and displacing the soft tissues beyond the point of tolerance. The operator must learn to determine how far the plate is to be extended onto the soft tissues by looking into the mouth and noting the soft

tissue attachment at different parts of the ridge, and by pulling the tissues out with the impression in place to see if they will dislodge it. Successful plates do not come from perfect impressions alone, and if you do not, on trying this technic, get ideal results, look well to the steps from the impression to the finished denture in the construction of the case. The most important step is the obtaining of a smooth gliding, balanced articulation in the set up of the teeth. Traumatic occlusion is as common to artificial as it is to natural dentures.

After this technic has been followed out for some time, the procedure may be changed somewhat, or an altogether different technic be employed to get the same end result, but the principles here defined will be retained.

M. E. Rambo, McAlester, Oklahoma: I understand that Dr. Hight intends this technic for normal cases. We have no trouble with the normal case. But with much absorption of the ridge, muscle attachments high buccally and lingually, tissue thick in the region of the median line and posteriorly and thin in the area of muscle attachments, modeling compound, in my hands, no matter how carefully warmed and readapted to the ridge gives undue compression. To avoid this, I cut out compound over areas of thin tissue and finish with plaster, thin as can be handled. I have attempted to apply nearly every technic taught today for lower impressions, but find that compound used alone produces unequalized pressure in the finished case. I should like to know whether Dr. Hight successfully reproduces the high muscle attachments in the finished impression. His technic is good in the normal case. It is the abnormal case of which I speak.

S. E. White, Port Arthur, Texas: I understood Dr. Hight to say that the greatest pressure is the farthest away from the escaping compound. He was speaking in regard to the heel of the impression. He didn't speak about the compound that is escaping along the periphery on the buccal and labial sides. In fact, that wasn't made clear at all. If the greatest pressure is at the farthest point of escape, how are we going to take care of the ridge all along on the buccal and labial sides, as we know that the modeling compound will escape labially and buccally and the greatest pressure is at the farthest point away from the escaping compound; in other words, on the ridge?

Dr. Hight (closing): Dr. McCoy spoke of the molar region of the lower. That is a very good point. The extension of the heels of a lower impression onto tissue that does not change is always desirable. It also secures the valve seal where needed most. Dr. Kruse's point of making the blocks smaller in order to get them into the mouths of some of his patients is a good one, as this becomes a necessity in some cases. My advice to men who might try this technic, especially those who are not trained in the use of compound, would be that they use the blocks as thick as possible at first. Dr. Rambo said that we had no trouble in normal cases. I feel that at least 60 per cent of my cases are normal and am free to admit that I have trouble with some of these. Until we improve our method with the normal case, we cannot hope to improve the abnormal. Dr. White spoke of the escapement of compound. I should like to refer him to Dr. Stansbery's[1] paper, which is to be read before this section. It deals in a scientific way with his point. We do know that, on account of the free escaping of compound, it is easier to handle on the lower than in the upper.

1. Stansbery, C. J.: Negative Pressure Method of Impression Taking, J.A.D.A., 12: 439 (April) 1925.

FURTHER STUDIES OF THE ETIOLOGY OF DENTAL CARIES

By THOMAS B. HARTZELL, M.D., D.M.D., F.A.C.D., and W. P. LARSON, M.D., Minneapolis, Minnesota

(Read before the American Dental Association, Dallas, Texas, November 10-14, 1924)

THERE is probably no problem in the science of dentistry that has received more study by the practicing dentist than that of tooth decay. It is a problem that is of the utmost interest to all, since a sound, healthy mouth is one of the fundamental prerequisites to health. In the solution of a problem such as the one under discussion, the first thing to be solved is the method of attack. The investigator must carry out his experiments under conditions that approximate those existent in the average mouth. This fundamental requirement is usually difficult to fulfil.

Since the time of Miller, we have been led to believe that decalcification of teeth is caused by acids formed from fermentation of carbohydrates by bacteria. Hence, the popular belief that sweets are bad for the teeth. In the light of this theory, we might logically draw the conclusion that all of us would have about the same amount of dental caries provided we were on the same dietary regimen, since the bacterial flora of the mouth is, with some individual variations, about the same for a given species, man, for example. Practical experience, however, shows the fallacy of such a conclusion. The fact that some teeth show signs of decay almost from the moment of eruption, while in other individuals they may remain as sound as the proverbial dollar throughout life, indicates clearly that certain factors which favor caries are inherent in the teeth themselves. The metabolism of the fetus may be the starting point of caries in early life, just as it probably is a potent factor in the incidence of rickets. It is not our intention to enter into a discussion of this phase of the problem further than to point out that dental caries is probably caused by several coordinated factors, some of which are not amenable to experimental attack at the present time.

It is not difficult to produce decalcification of teeth in the test tube. All that is required is to drop a tooth into a tube of dextrose broth and place it in the incubator for a few weeks, when signs of decalcification will usually be present. As so many bacteria form acids from the sugars, the bacteria carried on the tooth will usually effect the necessary inoculation. But are we justified in concluding from this experiment that, under conditions prevailing in the mouth, decalcification is effected by the same mechanism? It must be

borne in mind that teeth contain buffers that neutralize quite considerable amounts of acids before any macroscopic changes are evident. This is shown by the fact that teeth may be placed in an acidulated solution of a p_H of 3 or 4 without producing evidence of decalcification. In order to bring about acid caries, one must maintain this degree of acidity for some time by constantly adding more acid to replace that which has been neutralized. The proponents of the acid theory of caries are encumbered with the burden of proving that it is possible to have an acid mouth over an extended period of time. Personally, we have never seen an acid mouth. We hasten to state that we have seen innumerable mouths whose secretions cause blue litmus paper to turn red. This has been, in the past, regarded as indisputable evidence of acidity. However, litmus turns at p_H 7.2, which is decidedly on the basic side of the neutral point 6.99. Therefore, the litmus test does not indicate the presence of acid. We have, in a previous paper, set forth other evidence contradictory to the acid theory of decalcification. If we are to assume that caries is caused by the reaction of the environment, one wonders why the possibility of a basic reaction has been ignored hitherto. Tooth enamel is more readily broken down in the presence of an alkali reaction than in that of an acid one. If teeth are placed in a weak alkali solution, disintegration begins in a few days. These lesions, which bear a striking resemblance to the lesions found in the mouth, may be observed first at a point corresponding to the gum margin. It is not at all unreasonable to assume that a slightly alkaline reaction may occur in the mouth as a result of bacterial action on proteins. Among the large numbers of bacteria in the mouth may be found proteolytic organisms that attack proteins. The end-products of proteolysis are alkaline in reaction. One cannot be accused of undue imagination in believing that meat fibers are caught between the teeth are attacked by proteolytic bacteria; which brings about a localized alkaline reaction. There is nothing in the mouth to neutralize rapidly such alkalinity, and it is therefore not unreasonable to assume that proteolysis may play an important role in the etiology of the early stages of caries. That proteolysis does occur in the mouth is evidenced by "foul" mouth, with which every dentist is familiar.

We are not convinced that extreme reactions on either side of the neutral point are necessary to bring about lesions of the teeth. In experiments already reported, we have shown that bacteria may cause excoriations of the enamel in a medium that remains about neutral. We have reported such a result, due to *Aspergillus niger*.

During the past year, our experiments have been continued along similar lines. Instead of placing teeth in culture tubes in which a pure culture was grown, we have chosen mixed cultures in order to imitate, as far as possible, the conditions of the mouth, from the bacteriologic point of view. Unsterilized teeth were placed in sugar-free broth of neutral reaction to which was added some indifferent anaerobe. It is well known that anaerobic bacteria often grow well under ordinary aerobic conditions when grown symbiotically with aerobic organisms. The latter probably

use the oxygen in solution in the mediums, thus creating favorable conditions for the anaerobes. Some of the cultures were covered with paraffin oil to further favor the growth of the anaerobes. A high percentage of teeth treated in this way show lesions after a few weeks, even though the culture was nearly neutral (slightly basic) in reaction. A wide variation in the resistance of teeth to this treatment was noted, some not being affected after more than a year under these conditions, while others showed changes after from six to eight weeks' treatment. This observation indicates that certain teeth are "destined," as it were, to decay.

This is exactly what happens in the average individual. Some teeth are lost early, while others remain sound throughout the greater part of life. This variation in resistance is not observed in either acid or alkali "decay," in which one tooth is about as resistant as another; one of the strongest arguments against the acid or alkali theory of decay.

We are of the opinion that tooth decay is caused by several interdependent factors, among which bacterial activity and "predisposed" teeth are the most important.

DISCUSSION

Percy R. Howe, Boston, Mass.: I did not hear all of Dr. Larson's paper, but I gather that he has produced effects on teeth similar to caries by proteolytic bacteria. I can conceive of such a possibility. The more I study caries, the more I am inclined to believe that we have concentrated our thoughts too much on the inorganic elements of the tooth. It seems to me that we need to remember that the inorganic part of the tooth is bound with the organic in a true chemical combination. In examining by polarized light the substance of teeth that have caries, it will be seen that the dentin is becoming crystalline in structure, which indicates that the inorganic salts are being released from their organic or colloidal union, and to me means the first step in tooth disintegration. Destroy the organic part of the tooth in any way that this can be done and nothing but a fine powder or inorganic material remains. If this can be done by proteolytic bacteria, I can see no reason why a cavity could not be formed. It is my opinion that caries is rather a process of decalcification or tooth dissolution occurring much as decalcification of bones does in certain diseases. It is possible that it is a double process in which the bacteria may play a secondary part. We have not been especially successful in our attempts at eradicating caries, and I am sure that whatever the cause may eventually prove to be, it will be reached only when we understand more fully some of the principles that underlie calcium fixation, or the opposite, in the body at large.

Edward H. Hatton, Chicago, Ill.: In examining one of these teeth, I wondered if all of them were free of defects before they were immersed in the solution.

Dr. Larson: The surfaces were clear and smooth.

Dr. Hatton: Were any cultures made from these defects in the teeth, particularly from the deeper layers after defects had been produced?

Dr. Larson: No attempt was made to study the specific bacteriology of these cultures. We dropped the teeth in the unsterilized solution with the idea of dropping in the organism they naturally carried with them. To these cultures we added a proteolytic germ. In the final culture, the organism dominates. Most of them are ultimately killed, and particularly is that true when the cultures get old.

Dr. Hatton: Don't you think it would be worth while to classify the organisms from the depth of the lesion in the tooth?

Dr. Larson: It would be of interest.

R. W. Bunting, Ann Arbor, Mich.: In Michigan we have been carrying on a series of experiments that have occupied our entire time this year, in which we have followed the opposite point of view; i. e., we have investigated the possibilities of acid

destruction of the tooth. It is quite probable that we may find eventually that there are several different kinds of caries, but, in the paper that I shall present later, we have proof that to us, and to those who have viewed it, seems to be adequate, that there are present in the mouth continuously in every case of beginning and deeper caries, organisms that are able to produce all the specific defects of caries in a remarkably short time. I would take exception to one statement in the paper, to the effect that, in order to have decalcification of the tooth by acids, it is necessary to have a continuous mouth acidity. From our particular point of view, caries is distinctly a localized problem, and not generalized, and only secondarily dependent on the acid of the salivary secretion and the mouth environment as a whole. I feel this particular work is exceptionally valuable because it is well that various men should attack the problem from various angles. When we get through, let's put the cards on the table and see what they mean. I don't think we have arrived at the position where we can say definitely that caries is thus and so. It seems to be a complicated and obscure process and every contribution to this subject is very valuable indeed.

Dr. Larson (closing): As was stated in our paper, no one denies that caries can be produced experimentally in a test tube by acids. We are all ready to admit that fact. I desire, however, to question the possibility of having localized spots of acidity in the mouth when we have a neutral or slightly alkaline condition. We are all familiar with the theory that plaques may cover the bacterial colonies upon the tooth and in that way protect them from the surrounding medium. If we accept this theory, which has never been definitely established, we must assume that the carbohydrate from which the bacteria form acids can pass through the so-called plaques. Otherwise, there would be nothing from which acids could be formed. If, however, these imaginary plaques are of such a consistency as to permit carbohydrates to diffuse through, we must admit further that the hydrogen ion, which is infinitely smaller than the carbohydrate molecules, may diffuse out, or that alkali from the saliva may diffuse through the plaques and neutralize the acidity. It seems to me there is no evidence at the present time that caries is produced by acids. I think Dr. Howe hit the nail on the head when he said that before we know what causes caries, we must be able to produce it in the living animal under experimental conditions that we can control.

THE VALUE OF THE ROENTGENOGRAM IN EDENTULOUS MOUTHS

By FREDERICK F. MOLT, D.D.S., Chicago, Illinois

(Read before the American Dental Association, Dallas, Texas, Nov. 10-14, 1924)

THE impression that a mouth destitute of teeth is necessarily one free from infection or possible infectious factors is one difficult to alter, and it is only by demonstrating conditions frequently present that one can hope to drive home the necessity for looking under the surface. Logan, in 1921, reported thirty-five cases examined roentgenographically, in eight of which roots remained. Three of the eight appeared to be normal, while five showed periapical lesions. Two areas were designated as "unhealed" following the removal of teeth.

The object of this examination was to controvert the assertions of those converted to the theories of focal infection that all abscesses should be removed, and of those advocating open view operative procedures that complete surgery could frequently be accomplished only by such methods.

Gilmer, about the same time, reported a series of edentulous areas examined with also a nominal number of "unhealed areas." The roentgenograms displayed to illustrate these findings as well as those shown by Logan were open to criticism as being overexposed to a sufficient degree to cover up all but gross areas.

The following year, I reported a series of 900 areas examined, previous roentgenograms or determinable history of which indicated past pathologic involvement, of which number 48 per cent showed remaining roots or evidences of residual or retained infection.

Eusterman, of the Mayo Clinic, reports a series of 290 patients examined during a six months' period, of which number eighty-nine wearing dentures showed 129 roots and nine "residual rarefied areas." There were found also thirteen embedded or partially erupted teeth.

He reports also that animal experimentation revealed the "same positive results as those from teeth whose pulps had been devitalized."

In a more recent article, Gilmer states, quite at variance to the findings of Rosenow and Meisser, that "sclerosed bone . . . is not so penetrable to bacteria as are the cancellous structures formed in such localities."

Just what was meant by "unhealed" areas is in doubt; for, as a demonstrable fact, the bony structures will heal perfectly about either roots of vital or pulpless teeth or infected residue. This does not substantiate the naive assurance to the patient by the careless or incompetent operator that the root fragments that he has been unable to extract will "work out" or that abscesses always disappear. The infected tissue remaining uncuretted

after extraction must without a doubt be autogenetically eliminated in many cases, but under just what circumstances can neither be told or foretold; and the fact that so many of these areas are uncovered day by day by roentgenographing edentulous mouths and areas indicates that, under some conditions, the resistance of the patient is not equal to the task, and these areas remain "unregenerated." On operation, they prove to be soft bone areas, and as the same type of organism (the green-producing streptococcus) seems invariably to predominate in periapical lesions and also to be found in these unregenerated areas, the assumption is justified that it is the factor of the patient's physical resistance rather than the virulence of infection that is responsible for this failure. It would seem, therefore, that, since a large proportion of the patients who come under our care do so because of physical disabilities for which the teeth are held responsible, it would behoove us to do our work so thoroughly that the possibility of continued infection will be eliminated.

Roentgenographing as a preliminary to extraction and surgery and as a preliminary to denture or partial denture construction has therefore only one object to accomplish—the disclosure of conditions not otherwise ascertainable. Assuming that the case has presumably been prepared for dentures by extraction and that the requisite period for osteogenesis has passed—arbitrarily set at a year—what may be shown as underlying the tissues and hidden from observation?

1. Broken-off root fragments with or without surrounding pathologic areas. These will include roots forced into the antrum.

2. Impacted teeth that, having remained unerupted for a long period of years, have no opportunity to erupt even though the overlying teeth are extracted.

3. Cysts, originally radicular but remaining after the extraction of the teeth.

4. Perialveolar abscesses, remaining in situ and discharging through fistulas.

5. Residual areas of infection remaining unregenerated.

6. Sclerotic bone masses, often confused with root fragments and frequently only differentiated on operation.

7. Serrated bone, a saw-edged bony ridge due apparently to alternating areas of healthy and unhealthy bony structure, wholly unsuited for supporting dentures.

8. Knife-edged bone, an exceedingly thin and sharp ridge presenting an irritating and unstable support for dentures.

9. Imperfectly operated areas in which both bony structure and periosteum have been destroyed and replaced by scar tissue.

10. Excessive alveolar structure.

Taking these seriatim and attaching to them their relative significance, we may say:

All broken-off root fragments should be removed if they may be approached without too great a sacrifice of overlying structures, or penetrating such adjacent areas as the inferior dental canal. Many of these have no pathologic aspect and perhaps never may; but as the roentgenogram cannot be the index of this, the only safe procedure is their elimination when possible. If pathologic areas are present, the removal of this oleaginous infected bone is imperative, calling for the thorough curettage of the infected area. Careful surgery under block anesthesia is recommended, rather than destructive attack with forceps under nitrous oxid, in order that the shape of the ridge may not be altered.

Impacted teeth are a frequent source of irritation and a causative factor in many referred pains. The gradual absorption, as well, of the overlying alveo-

lar structure frequently permits the denture eventually to bear upon these teeth, producing an irritation that, with its possible eventuation in malignancy, should never be ignored. If it is a probability or an actuality that the dentures may or do rest upon such teeth, their removal is indicated.

All too frequently in the extraction of teeth without roentgenograms or in spite of them, cysts or perialveolar abscesses are permitted to remain undisturbed although the causative tooth factor is removed. A radicular cyst assumes at once the character of a true epithelial cyst, and does not "knock off work" for a moment. Its growth may carry it to the nasal floor, into the antrum, through the mandible or into the ramus and, when discovered, it may already have caused extensive destruction. These cysts should, of course, be removed. Theoretically a perialveolar abscess may become a cyst and cease to discharge through an established sinus; therefore, its removal in either state is indicated. Radiolucent areas suspected of being residually pathologic, assuming that the requisite osteogenetic period has passed, should be opened and thoroughly curetted. These are almost invariably found to occupy a well defined space corresponding to that previously occupied by a pericementoma or perialveolar abscess. When permitted to remain, these cause excessive atrophy of the overlying bony structure.

The significance of sclerotic bone or condensing osteitis has yet definitely to be determined. Many areas have such a toothlike appearance that their operation is indicated. If their position is such that the denture will ride upon them, it is desirable to remove them. On the basis of pathology, probably all should be removed for safety. Heidbrink reports some interesting clinical facts in cases in which he has removed these masses, bringing about a cessation of systemic derangement.

In cases of both saw-edged and knife-edged alveolar ridges operative procedure is indicated in order to provide a comfortable and stable base for dentures as well as to avoid progessive atrophy. It has been found that the reduction of such ridges makes possible the comfortable adaptation of dentures in cases in which they could not previously be tolerated. In the cases of knife-edged ridge, this reduction must frequently be extensive.

Imperfectly operated or overoperated areas have no pathologic significance, and may, for the most part, be ignored. The appearance of these spots is that of extreme radiolucence, since only tissue remains.

The excessive alveolar structure remaining does not usually need to be demonstrated by the roentgenogram. Clinical observation will readily call attention to the case superficially operated on or the area in which the only work done has been the extraction of the teeth, with no regard for the eventual restoration. Alveolectomy will accomplish the requisite reduction and shaping. An excessively large tuberosity is frequently found to have been a catch-basin of drainage from previously adjacent pathologic teeth, and, in such cases, curettage as well as reduction is indicated.

In edentulous mouths, the roentgenographing often presents more of a problem than in dentulous cases. Lacking the support of the teeth, it is difficult to place the films or retain them in the desired positions. Upper molar regions should be shown with the tuberosity, which acts as a landmark as well. These films should be so held or padded

as not to be obscured by the malar shadow and to show the antrum floor. Practically as many exposures should be made as when the teeth are present, and distortions are just as much to be avoided. Other landmarks are the nasal spine and antrum in the maxilla, the retromolar triangle, the mental foramen and the geniohyoid tubercle in the mandible.

In the edentulous mouth, the roentgenogram will be overexposed usually if as great penetration as is required for the ordinary roentgenogram of complete mouth with teeth is used. From a 2 to a 3 inch back-up is generally considered sufficient.

Areas or root fragments not readily located because of lack of landmarks may be approximated, and a very small metal strip, the location of which is marked on the gum tissue with an indelible pencil, may be retained with adhesive tape while a check-up roentgenogram is made.

The use of extraoral roentgenograms is in many cases desirable for checking up, and, where the depth below the ridge is very slight, it may be necessary to resort entirely to these for the mandible. Localizing roentgenograms made on what would be the long axis of the teeth will occasionally be of value.

Familiarity with the appearance of the mylohyoid groove, the mental, anterior and posterior palatine foramina, canine fossa and antrum should prevent misinterpretation or unwarranted and unnecessary operative interference. As the first step, all anatomic deviations should be considered.

The roentgenogram in dentistry, as well as in medicine, has the definite purpose of disclosing conditions that are not otherwise discernible. It is not designed or expected to take the place of clinical examination, but is used as a diagnostic adjunct in connection therewith, to form an invaluable and indispensable factor.

Its use in edentulous mouths is just as imperative as when the full complement of teeth is present.

DISCUSSION

Earle H. Thomas, Chicago, Ill.: The necessity of obtaining full-mouth roentgenograms of all edentulous mouths before the commencement of restorative procedures is most amply substantiated both by statistics and by the daily personal observations of every exodontist and oral surgeon. If there is any one type of patient who does not receive the best scientific care that modern dentistry is able to render, it is the patient suffering from the effects of focal infection, who is thoroughly examined by men covering every specialty in the medical profession, but to whom is never suggested the necessity of a competent examination roentgenographically and otherwise by a modern dentist; such neglect being due to the fact that the mouth is found on casual observation to be edentulous. I often make the statement to the patient that it is more important to roentgenograph edentulous areas than it is to thus examine the remaining teeth. Whenever such an examination is advised, we must be very careful to obtain good roentgenograms. Extraoral films are very valuable for rough checking up, but every area of the jaws should also be covered by the small intraoral films, and, as Dr. Molt has said, these must not be exposed to too much penetration of the roentgen rays. If overexposed, and this is especially true in extraoral films, areas of rarefaction may be overlooked because the density of the surface cortical layers of the bone makes difficult the differentiation of changes in the comparatively small calcific content of the cancellated structure. Dr. Molt has enumerated several abnormal conditions that may be discovered by roentgenographing the jaws, from which we logically draw the conclusion that *all* broken off root-tips do not work out, and that *all* noncuretted granulomatous tissue is not taken care of by Nature. Of course, all root-tips having abnormal radiolucent areas in contact with them should be removed; but, as Dr. Molt has so aptly stated "The roentgenogram can never be the index of the future safety of such root-tips"; having no present apparent bone destruction. However, if any of these are allowed to remain, they should most certainly

be checked up roentgenographically every year; advice that is rarely followed. No one can truthfully make the statement that Nature never takes care of granulomatous tissue remaining in a socket because of noncurettement. Nature usually does, in her miraculous way, take care of this infected tissue, replacing it with healthy bone; but there is such an unsuspected percentage of cases that remain healed over but diseased that, if areas are left without curettement, they should be checked by the roentgenogram at the end of one year to satisfy the operator that Nature has filled in the area with normal calcified cancellous tissue. If such an area is replaced with sclerotic bone instead of normal cancellous bone, it is still, to me, an open question whether or not this is dangerous to the patient. If the roentgenogram reveals no filling of the area, it is usually because of the activity of embryonal epithelial débris, which may convert the chronic abscess into an infected epithelial cyst. Many difficulties that harass the prosthodontist are caused by serrated and knife-edged bone and by excess alveolar structure, the roentgenogram revealing the former and demonstrating that the latter has or has not underlying pathologic changes. Dr. Molt has emphasized the importance of and the methods for localizing abnormal conditions in edentulous jaws, but I must caution the operator to know the physical characteristics of the film used. Some are glossy on the surface placed in closest proximity to the tissue; some are glossy on the opposite side; some are dull on both sides; etc. Also, in the examination of mounted roentgenograms from some other operator, we must remember that some operators place the films of the patient's right jaw in the left windows of the mount and others place the right side films in the right windows of the mount.

Another method of localizing, which is very simple, is the insertion in the tissue of a short hypodermic needle, which remains until the film has been exposed and the point of insertion marked.

The roentgenogram is of no value to the patient as an aid to the discovery of impacted teeth, unless the operator is insistent on the removal of such teeth. If allowed to remain, they can cause many serious conditions, some apparent, and others almost impossible of demonstration until permanent and incurable pathologic changes have taken place. Therefore, it is advised that the patient will receive the best preventive service by the removal of all impacted teeth.

E. W. Browning, Salt Lake City, Utah: Dr. Molt said that he varied his technic when examining edentulous mouths roentgenographically. I believe it is better to use exactly the same technic on edentulous mouths as on mouths in which the teeth are in place. By so doing, we are able to make a comparison and thereby note all bone changes. Several times, Dr. Molt made the remark that this is a suspicious area and will stand inspection. Some of the audience may get the idea that he means surgically. I understand that he means first roentgenographically and then surgically. In the first of the last two slides, Dr. Molt pointed out the different pathologic conditions: root ends, retained granulomas, serrated ridges, etc. The beautiful texture of the alveolar process may be noted in this case. I take it that Dr. Molt uses the McCormack technic and, although he makes a variation in edentulous mouths, I believe his technic is the same for all edentulous mouths; therefore, we may compare the roentgenograms of one edentulous mouth with those of another. The main point in roentgenographing edentulous mouths, the point that should interest the prosthetist, is the fact that the roentgenogram of the osseous tissue shows in advance whether the alveolar process is going to bear up under a denture or is going to dissolve. In some of the first cases shown, the alveolar process was gone even to the floor of the antrum. In this case, the density, the irregular cancellations, the beautiful texture of the bone, may be noted. Also, in these cases, it may be noted that, when we have retained roots, we have very small pathologic areas around these roots. I do not mean that they are not doing so much harm, but they are not the large areas shown in the mouths in which the texture, the density, in fact the whole structure, is not so clear-cut. In the second case, the texture seems to lack something; it lacks calcium. What we see in a roentgenogram is the calcium salt. If on roentgenographing these mouths before the removal of the teeth, we find this lack of calcium, we will place the patient on a diet of foods such as cheese, milk, and vegetables, that are high in calcium, or send them to their physician to have calcium injected intravenously, and build them up to the point where the alveolar process will stand as it should. We will then eliminate the condition as shown by Dr. Molt, where the al-

veolar process is completely gone. Then we will find few of these unfortunate people who have to continue through life with a mouth in which it is absolutely impossible to wear dentures.

Dr. Molt (closing): Dr. Thomas spoke of one thing that I feel very strongly on, and that is the matter of checking up frequently on cases in which no curettage has been done —checking up with the roentgenogram. Such checking up should not be necessary, no such duplication of operation and no such loss of vital effort as the patient must put forth if these areas are not curetted should be called for, the point being that if we are complete in our surgery to begin with there will be no pathologic areas. Of course, if we have not seen the patient until he comes to us, presenting an edentulous case, we have no opportunity to do anything but take care of the failures of the previous operator. Dr. Browning spoke of the varying penetration. Both Dr. Browning and I have obtained some valuable points on roentgenography from a man to whom we are always glad to give the honor and credit, Mr. McCormack, of San Francisco. It is a sad commentary on dental roentgenography that the man doing what is by far the best oral roentgenography of this country is a layman, but that is a fact nevertheless. It has been my procedure to vary my technic in this degree: that we cut down the penetration from 4¼, which we ordinarily use for edentulous mouths, to 3, and sometimes only 2 inches of penetration to bring out the texture of these very thin ridges. The other texture I find burns up the detail that I want to bring out very frequently. Dr. Browning's experience may not have been such. He may not be using so much penetration as I am for the average work. But that is a thing that we may thresh out and get together on, I am sure. He asked what I meant by "investigation of suspicious areas." I mean both roentgenographically and surgically. The calcium content is a thing that I am glad he has called attention to. We have had more in the last week than we have previously had on the matter of calcium content. Dr. Price has brought us a great deal and will give a great deal to the general society on that matter. We, in our Oral Surgeons and Exodontists Society, have had a continuous round of references to calcium content. This matter of calcium content I have frequently called attention to in the matter of pyorrhea treatment, that is as to the advisability of treatment for pyorrhea or the inadvisability. It is perhaps of greater value or at least of as great value in this matter of determining what we have as a foundation for denture construction and whether we should go into internal medication and diet to permit our patient to have a better basis for denture construction, as in the previously stated use.

METALLOGRAPHY OF THE PRECIOUS METALS USED IN DENTISTRY

By JOHN S. SHELL, B.S., San Francisco, California

(Read before the American Dental Association, Dallas, Texas, November 10-14, 1924)

BROADLY considered, the science of metallography includes all those methods of investigation that deal with the study of the internal structure of metals and alloys. The majority of such investigations are made with a metallurgic microscope, which consists of an ordinary microscope with a vertical illuminator attachment for throwing a beam of light on the surface of the opaque metallic object. By this means, sufficient light can be concentrated on the surface of the metal to enable it to be seen at high magnifications. The modern methods for the heat treatment of various alloy steels, brass and bronze have been developed partially from results obtained by the use of this instrument.

Recently, a number of articles have appeared in the dental literature illustrating by photomicrographs the various structures of the dental alloys. These articles have dealt principally with the structure of clasp metal,[1] the effect of metallic impurities,[2] and the occurrence of oxid pits and gas occlusion.[3] As such investigations of the precious metals offer an undeveloped field for the science of metallography, it is probable that dental literature will soon contain numerous articles dealing with the application of metallography to the various dental alloys.

From the standpoint of advertising, the results obtained by metallographic examination offer a great opportunity for manufacturers to inform the dental profession concerning the nature of their products. The photomicrographs of the metal are usually pleasing to the eye, but by suitable lighting and developing effects they can be modified to a great extent. A number of manufacturers have been using these pictures for advertising, but they have not always furnished sufficient data for their interpretation. For the purpose of understanding these advertising claims, as well as articles appearing in periodicals, it seems advisable that the dental profession be well informed concerning various aspects of metallography and that they learn the meaning of a few of the terms used in connection with it.

From the standpoint of metallography, crystallization and subsequent recrystallization of a metal or alloy are of utmost importance. The manner in which metals crystallize determines in a large degree the physical properties of a cast metal; while their ability to recrystallize

1. Williams, R. V.: Internat. J. Orthodontia, 9: 569, 1923.

2. Shell, J. S.: Gold Castings—with Special Reference to Cast Gold Inlays. J.A.D.A., 10: 187 (March) 1923.

3. Thompson, E. C.: Manipulation of Wax, Investments and Casting Gold, J.A.D.A., 11: 203 (March) 1924.

after deformation determines the effect of heat treatments such as annealing and tempering.

When a pure metal is allowed to cool slowly from a molten condition, a certain temperature is reached, at which crystals begin to form. These crystals are at first very small, but they continue to grow as more metal solidifies until they encounter other solidified crystals. This process continues until all the liquid has become solid. The result of such a process will be a mass composed of more or less regularly formed solid crystals with narrow boundaries between them, containing any small amount of insoluble impurities that the metal may have contained. A cross-section of such a metal would show a number of grains separated by fine lines such as are shown in Figure 1. The size of these crystals or grains is determined by the number of small crystals that form initially, which is due, in turn, to the rate at which the metal is cooled: the slower the cooling, the larger the grains. The shape of the grains would have been regular as in any crystalline substance if no interference had been encountered during solidification. Other crystals forming at the same time cause the grains to occupy any space left in the liquid mass, preventing the formation of regular crystals. The resulting masses are called grains.

This simple form of crystallization does not occur in the case of alloys, although one type of alloy closely resembles a pure metal in structure. Such alloys form solid solutions. When the two metals are melted together, a homogeneous solution results which, when solid, remains as a solution. This type of alloy appears homogeneous under high magnification and, in fact, could seldom be distinguished from a pure metal by microscopic analysis. A cross-section shows a number of grains with narrow boundaries and with the exception of certain "coring" effects sometimes noticeable, which are due to segregation, is identical with a pure metal. These metals, however, are as nearly

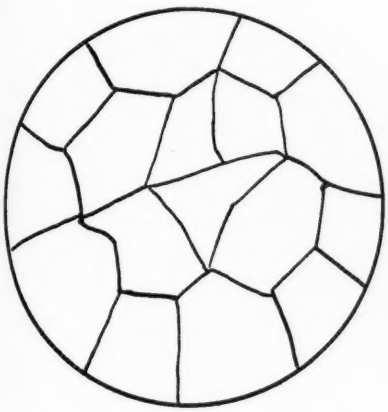


Fig. 1.—Typical structure of the grains of a pure metal of solid solution.

Fig. 2.—Pure gold etched with nitrohydrochloric acid (aqua regia); typical of pure gold. Figures 2-6 are slightly reduced from a magnification of 100 diameters.

homogeneous in the solid state as it is possible for any alloy to be.

In addition to alloys forming solid solutions, there are those forming entetic mixtures or chemical compounds, and others forming combinations of these. Owing to the lower melting point of entetic alloys, they are often used as solders.

The casting alloys used in dentistry belong almost invariably to the solid solution type, such as gold-silver, gold-platinum and gold-copper, within certain temperature limits. These alloys, then, will appear as a number of grains with narrow boundaries, and this is the result obtained when a section of an ordinary gold casting, such as an inlay, is polished and etched with nitrohydrochloric acid (*aqua regia*) and examined under the microscope (Fig. 3). Such a structure is usually found in a soft malleable casting, such as the gold castings.

In the casting process, the size of these grains can be partially controlled by the rate of cooling of the metal during solidification. The various casting methods, then, may give alloys with different structures, according to the size of the grains in the alloy. When a metal is cast, it flows through the sprue and strikes the walls of the cavity, from which the wax has been eliminated. These walls will always be colder than the molten metal and so will chill it more or less rapidly. For a perfect casting, the metal must flow to the extreme margins before solidifying, and so it must be heated sufficiently to withstand the cooling influence of the mold until these margins have been filled with metal. As soon as this occurs, the metal should solidify rapidly, both to form small grains and to prevent excessive shrinkage. The temperature of the mold, then, is not of such great importance as the temperature of the gold, which should be sufficiently high to maintain the alloy in a fluid condition until it has reached the extreme margins of the casting. Any increase in this temperature will result in the gold remaining in contact with the margin in the liquid state, causing a double shrinkage

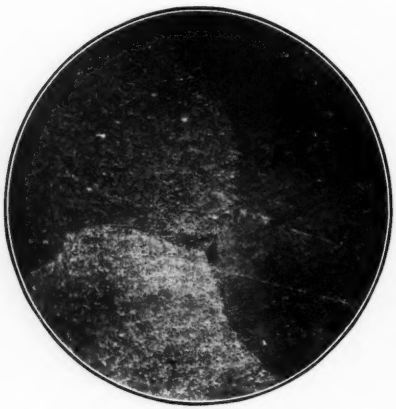


Fig. 3.—Twenty-two carat gold-silver alloy etched with nitrohydrochloric acid; typical of solid solution.

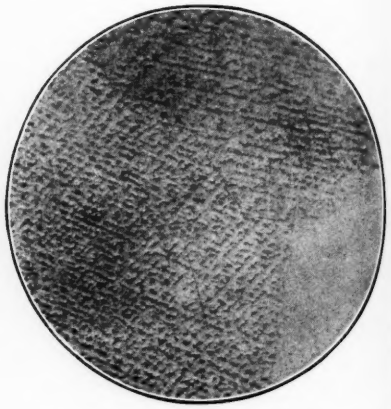


Fig. 4.—Twenty-two carat gold-copper alloy etched with nitrohydrochloric acid; typical dendrite structure.

of liquid gold to solid gold and solid gold to from 1060 to 20 C. Any decrease in this temperature will cause the gold to solidify before it reaches the margins, and rounded margins will result. If a hot mold is used, the chilling effect on the gold will be less, and the gold can be cast at a lower temperature. For a cold mold, a higher casting temperature is necessary owing to the increased chilling effect on the molten material. The shrinkage of the casting when heated to

Fig. 5.—Twenty-two carat gold copper alloy etched with nitrohydrochloric acid; showing structure after mechanical treatment, with broken grains and slip bands crossing them.

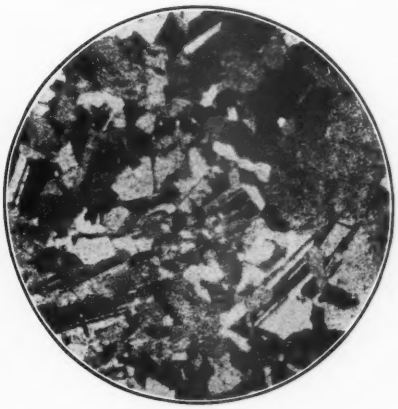


Fig. 6.—Twenty-two carat gold-copper alloy etched with nitrohydrochloric acid; showing result of annealing alloy shown in Figure 5 and cooling rapidly. Twinning will be observed, which is characteristic of an alloy after working and annealing.

the proper temperature is largely due to the gold shrinkage in changing from 1063 to 20 C., or room temperature, any change in dimension of the mold being negligible in comparison to this shrinkage. In addition to these effects of overheating the gold, there is the additional disturbance caused when the sprue separates from the casting. This is, as a rule, due to the gold solidifying so slowly that a liquid portion remains around the sprue after the latter has started to solidify. This liquid portion joins with either the sprue or the casting and, on solidifying, shrinks more than the previously solidified casting, leaving a pit. If molten metal is trapped within the casting, this pit may not show until the surface of the casting has been ground down perhaps 1 mm.

The greatest difference, from a metallographic standpoint, between a pure metal and a solid solution is in the range of temperature at which solidification takes place. In the case of a pure metal, the temperature remains constant during solidification; in a solid solution alloy, this solidification extends over a range of temperature, with an alloy of varying composition crystallizing at each temperature. This will necessarily cause some segregation of the metals in that the composition will vary from point to point; but this variation will be continuous. This means that alloys of varying composition may be found throughout the casting but the metals in a pure state can never be entirely isolated from such an alloy by crystallization. As a

rule, this segregation is so slight that it cannot be seen under the microscope, but in marked cases it causes coring, before mentioned.[4] The magnitude of this segregation has not been determined in the majority of the dental alloys, but indications seem to show that it will be greatest in the gold-platinum alloy.[1]

The presence of a small amount of impurity in the gold alloys affects the microscopic appearance in a marked degree. In the case of small amounts of

Fig. 7.—Aluminum bronze, 90 per cent copper, 10 per cent aluminum etched with ammonia hydroxid and hydrogen peroxid; showing the structure of a slowly cooled alloy with two types of crystals. Figures 7-9 are slightly reduced from a magnification of 300 diameters.

metallic impurities,[2] such as bismuth, tin, zinc and iron, the entire crystalline structure is changed, no longer showing the normal appearance of a solid solution. The most detrimental metallic impurity is probably iron. This may be absorbed by the gold from possible impurities in the investment material, from rust or from the instruments used in handling the metal at elevated temperatures. The alloy, after absorbing iron, becomes sluggish, and it is almost impossible to cast it properly. The appearance of a section of gold containing a trace of iron differs radically from that of pure gold, and this method of microscopic analysis is a simple means for determining the presence of a trace of iron impurity.

The question of nonmetallic impurities,[4] such as gas occlusion and oxid inclusions, has not been so thoroughly investigated as that of the metallic impurities.

After dental alloys have been cast, more or less mechanical work is usually done on them. In the case of gold inlays, perhaps only grinding, polishing and some burnishing are done. For this purpose, the majority of the alloys need no further heat treatment to counteract this mechanical treatment. Whenever a great amount of such mechanical treatment is performed on a metal, subsequent annealing is necessary. The cast alloys are usually composed of relatively large grains with small boundaries, and the effect of mechanical treatment such as forging and swaging is to cause breaks in the grains or crystals. The space between the broken grains fills with finely divided metallic particles, which act as a cement between the broken parts of the crystal and prevent any further movement along that line. If the forging is continued, the crystal must break again, and as this process continues, the crystals become smaller and smaller until a point is reached where the metal can no longer be satisfactorily worked owing to the excessive amount of amorphous cement. Any additional forging will tend to break the metallic cement, binding the crystals together, and the metal will fracture. In practice, the metal becomes hard and brittle and unworkable, and must be annealed before further mechanical treatment will give satisfactory results. If the mechanical treatment is

4. Harder, O. E.: Gold Casting, J.A.D.A., 10: 869 (Sept.) 1923.

drawing, the crystals are all broken in one direction, and as a result the metal can be displaced perpendicularly to the direction of drawing but not parallel, and we have resiliency, as found in drawn wire.

Assuming no interfering factor, the metal can now be heated and the original softness regained, owing to recrystallization of the finely divided amorphous cement binding the crystals and causing the hardness. This cement tends to form crystals again as soon as the temperature is sufficiently high, and so the original microstructure can be obtained. These reformed crystals are similar in every respect to the original grains, with the exception of size and shape. It can easily be seen that, under these conditions, the rate of cooling or heating can have no effect on the annealing process. Certain surface conditions not included in this discussion that vary with different rates and methods of cooling are of great importance in annealing foil. The effects of annealing and forging can be followed closely by means of microscopic analysis, and the rate of annealing can also be determined by such examinations. The grains, after mechanical working, show dark bands crossing them, all of the bands being parallel in a single grain. These dark bands, called slip bands, are caused by the imperfect reflection of light from the finely divided metallic material. On annealing, these bands disappear and the grains become larger. When all these bands have been eliminated and the grains are normal in size, this annealing process is complete. The grains never return to their original size and are now less regular in shape than on casting, but their properties remain the same. By continued mechanical treatment and annealing, the grains become smaller.

Fig. 8.—Aluminum bronze (× 300) etched with ammonia hydroxid and hydrogen peroxid; showing effect of mechanical treatment of alloy in Figure 7. The grains are broken and slip bands are in evidence.

This discussion has assumed that no interfering reaction would take place on heating and cooling the metal. This is true only in the case of a pure metal or an alloy forming a solid solution. It is well known that the rate of cooling has a marked influence on the physical properties of steel, so it is plausible to assume that some interfering factor has brought about this result. This is found to be the case as transformation takes place in the crystalline structure of the steel below its melting point or in the solid state. At about 700 C., the structure changes from a coarse grained, soft system of crystals to a fine grained, almost amorphous material. If the steel is cooled rapidly from above 700 C., which does not allow this transformation to take place, the steel is hard. On the other hand, slow cooling allows the large grained, soft crystals to form, giving a soft steel, which can be machined. This last process is called annealing, in the steel industry. In alloys in which transformation takes place, this must be taken into consideration in subjecting the metals to heat treatment.

One of the most important dental al-

loys exhibits this property of transformation in the solid state. This is the system of gold-copper alloys that, at the melting point, form a solid solution, which is malleable and relatively soft. At a temperature of about 380 C., two chemical compounds form between the gold and the copper.[5] These have the atom percentage corresponding to AuCu (gold-copper) and Au_3Cu. The AuCu compound corresponds almost exactly

Fig. 9.—Aluminum bronze (× 300) etched with ammonia hydroxid and hydrogen peroxid; showing effect of annealing alloy in Figure 8. The grains are larger and more regular, with no evidence of slip bands.

to 18 carat gold-copper alloy. In the case of steel, the crystals forming at the lower temperature are the softest, but, in the case of the gold-copper alloy, the crystals of the solid solution are softest. The crystals of the compounds are hard and brittle, and so it is to be expected that this alloy would become hard and brittle if heated to 380 C., for any length of time, compounds thus being allowed to form.

The annealing of an alloy of gold-copper, then must be modified in order that a soft malleable alloy may be obtained after severe mechanical treatment. If the alloy is heated to dull redness, or about 750 C., and that temperature maintained till the metal has recrystallized, the grains will be of the solid solution type with no compounds existing. The metal must be cooled rapidly from this temperature to prevent formation of the compound at 380 C., in order to produce a soft malleable metal. For this particular alloy, the rate of cooling has a decided influence on its physical properties.[4] A rapid cooling results in a soft malleable alloy, while a slow cooling results in a harder alloy. It is evident that a complete knowledge of the internal structure and its possible modifications is necessary for proper handling of the alloy even now in use. With the more complicated alloy now being placed on the market, it is impossible to anticipate the further difficulties that may be encountered.

5. Kurnakow, Zemcynozny and Tasedatelen: Internat. J. Metals, 15: 305. 1916.

DISCUSSION

Carl W. Knapp, Minneapolis, Minn.,: Microscopic examination reveals, peculiar characteristics of various alloys that were hitherto unsuspected, and from this type of study we should learn much of value. Heretofore, we have been largely dependent on the statements of various manufacturers as to the physical properties and working qualities of their products. Research, such as is being done by Mr. Shell, will do much to promote more careful statements. For example, the statement has been made that one grain of copper, silver or nickel added to pure gold will debase the alloy; when, as a matter of fact, these metals are added by the honest manufacturer to give to his product certain very desirable qualities. Thus, copper, in the correct proportion, adds hardness, keeps the color properly balanced and lowers the melting point, all of which are desirable. Another statement as to the desirability of melting gold by radio in manufacture may be true, but when we, as dentists, take this gold and melt it in an open crucible with our ordinary melting flames, the resulting casting seems to have about the same possibilities of faults as those made from golds manufactured in the ordinary

manner. Pits are ordinarily found in hard golds containing platinum or palladium, from occluded gases. Other types of pits are caused by the presence of oxids, which are evidenced after the surface skin is ground away and polished as is done in our practical work. These types of pits are shown in the photomicrographs exhibited by Mr. Shell. The large pit he shows is, I think, caused by gas rather than by the manner in which a casting cools. If our mold is undercarbonized or contains raw wax at the time of casting, when the molten gold is thrown against these particles of incompletely volatilized wax, a flash is caused, with a resultant gas, which is caught by the gold surrounding it, brought toward the sprue hole and trapped by the congealing gold. The separation of the sprue is, I think, usually due to lack of continued pressure at the time of casting or from gas formed. The breaking off of the sprue is due to oxids in excess at the point of union of the entering gold and that gold which has filled the pattern chamber and is trying to get back to the point of entry. Much better results can be obtained with our castings by a routine practice of refining every residue button. A simple and yet efficient method of doing this is to melt the button on a charcoal block, sprinkle on it a few grains of ordinary borax, which is a neutral or basic flux, and dissolve the earthy oxids into a slag, which is removed with slate pencil or wooden stick. Then remelt and add a small pinch of reducing flux, which acts chemically on the copper oxids about as follows:

$$2\ CuO+C=CO^{2}+2\ Cu$$

The pure copper thus reduced realloys itself, while the carbon dioxid passes off as a gas. Thus, we have practically new fresh alloy to recast. Most of our gold alloys containing copper may be heat-treated to advantage as regards the hardness and toughness increase, by first heating to redness and then cooling very slowly. By laboratory experiment, we increased these qualities in some cases 40 per cent in this manner. Fatigue of gold alloys should be studied much more thoroughly in future so that we may know what metals will best withstand repeated bendings and torsion at stresses below the yielding point, such as cast clasps are called on to withstand. Much is known of the fatigue of cast iron and steels but very little about gold alloy castings.

MICROSCOPIC COMPARISON OF TWO GOLD ALLOYS

By JOHN S. SHELL, B.S., San Francisco, California

(Read before the American Dental Association, Dallas, Texas, November 10-14, 1924)

TWO castings were prepared for metallographic examination; one from a proprietary alloy, which was prepared, as stated in the literature, in such a manner as to exclude oxids of the base metals as nearly as possible, and the other from 22 carat gold-silver-copper alloy containing equal parts of silver and copper. With this alloy, no precautions were taken to eliminate oxids. These castings were made by investing two pieces of wax 6 mm. long, the same casting technic being followed for each alloy. The castings were made by an independent operator, who handled the gold as it would be handled in practice.

The castings were subsequently examined and appeared to be perfect. The sprue was then removed, and the two ends of each of the castings were polished and etched with nitrohydrochloric acid (aqua regia). The photomicrograph Figure 1A is taken on the end of the casting most remote from the sprue. The same applies to Figure 1B, Figures 1-7B being the 22 carat alloy and Figures 1-7A, the proprietary alloy. After obtaining Figures 1A and 1B, the alloys were filed down 1 mm., repolished and etched in the same manner and the resultant structure is shown in Figures 2A and 2B. This was continued through the entire casting, and the photomicro-

graphs Figures 1-7A and 1-7B were obtained, so that Figures 7B and 7A are, respectively, the sprue end of the 22 were etched with nitrohydrochloric acid and the photomicrographs were made by using oblique illumination.

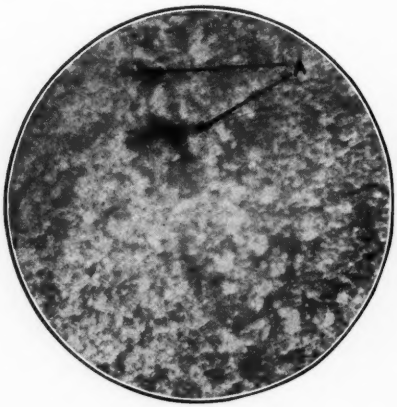


Fig. 1A

Fig. 1B

Fig. 1.—A, proprietary alloy; B, 22 carat gold-copper-silver alloy. Figures 1-7 are slightly reduced from a magnification of 100 diameters.

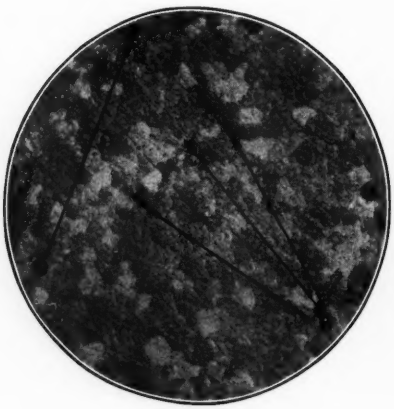


Fig. 2A

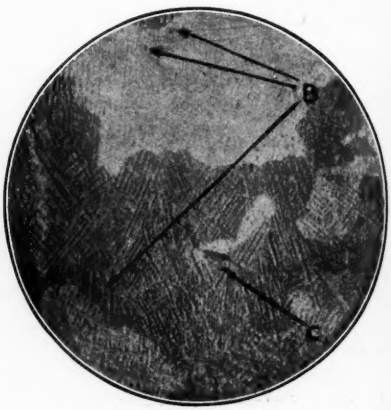


Fig. 2B

Fig. 2.—A, proprietary alloy; B, 22 carat gold-copper-silver alloy.

carat gold-silver-copper alloy and the proprietary alloy. The magnification in every case is the same, being approximately 100 diameters. The surfaces

The crystalline structure of each alloy is typical of a quickly cooled solid solution. The series A shows the same type of structure as pure gold quickly cooled;

while the series B shows the dendrite structure of rapidly cooled gold-copper or gold-platinum alloy. In slow cooling or annealing, each alloy should appear the same under the microscope.

The object of this work, however, was to show any possible irregularities in the alloys, without much regard to the crystalline structure, which can be varied almost without limit by heat treatment during and after casting.

Fig. 3A Fig. 3B

Fig. 3.—A, proprietary alloy; B, 22 carat gold-copper-silver alloy.

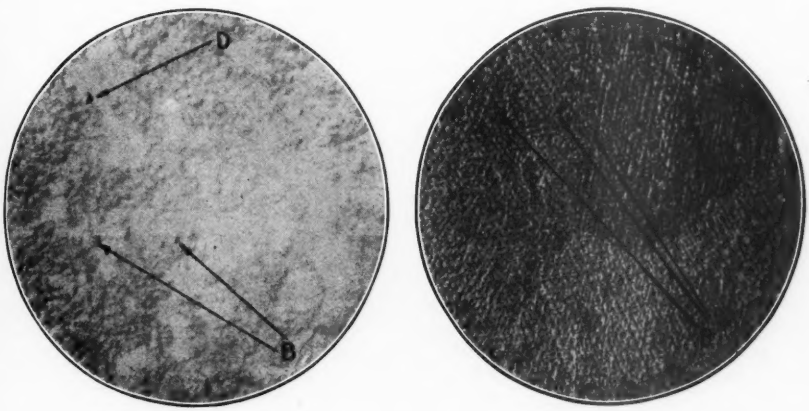


Fig. 4A Fig. 4B

Fig. 4.—A, proprietary alloy; B, 22 carat gold-copper-silver alloy.

These photomicrographs show four types of irregularities. Two are due to the internal structures and two to the technic used in taking and developing the plates. They are as follows, and

will be labelled on the Figures by the letters *A, B, C, D; A,* large cavity due to improper casting; *B,* small pits possibly due to: (1) oxid occlusion, (2) gas occlusion, (3) improper casting; *C,* break in continuity of picture due to dust particles lodged on object; can be detected by light object throwing dark shadow; *D,* dark irregularity due to rupture of film on plate occurring during developing.

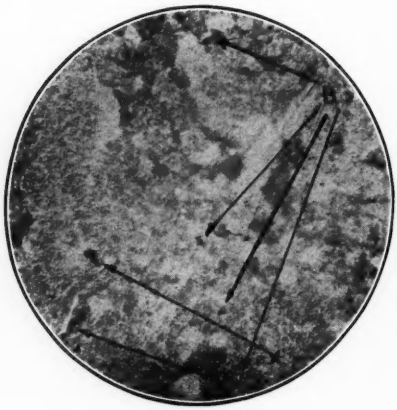


Fig. 5A

Fig. 5B

Fig. 5.—A, proprietary alloy; B, 22 carat gold-copper-silver alloy.

Fig. 6A

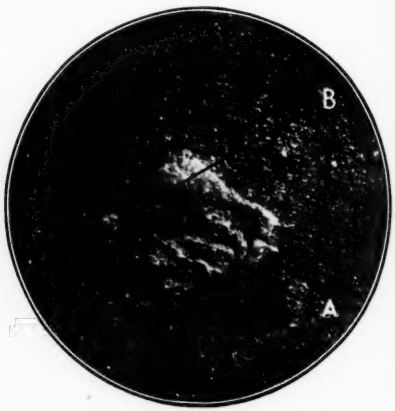


Fig. 6B

Fig. 6.—A, proprietary alloy; B, 22 carat gold-copper-silver alloy.

Figure 1A, the first section of the proprietary alloy, shows the small, regular grains or crystals of a casting of pure gold or gold-silver alloy cooled rather rapidly. The two large dark spaces rep-

resented by the arrows from *A* are cavities that could be seen with the eye before etching. This would seem to indicate that they were not due to impurities in the casting, such as oxids or foreign metals, which would etch out first and so show a similar structure after use of some reagent, but are, rather, spaces in the metal itself formed during the casting process, possibly by occlusion of gas, but more probably due to rapid congealing of the metal before these spaces were filled with the molten alloy.

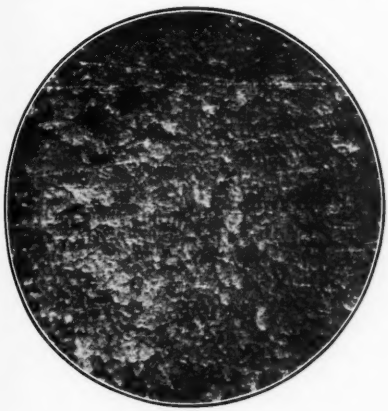


Fig. 7A

Fig. 7B

Fig. 7.—A, proprietary alloy; B, 22 carat gold-copper-silver alloy.

Figure 1B, the first section of the 22 carat gold-copper-silver alloy, shows a typical structure of a rapidly cooled gold-copper or gold-platinum alloy, such an alloy being generally harder than an alloy with the structure shown in Figure 1A. There is little indication of any small or large cavities.

Figure 2A shows a number of small pits, a few of which are indicated by the arrows from *B*. The arrow from *D* indicates an irregular spot, due to an imperfect film.

Figure 2B shows a number of pits, indicated by the arrows from *B* and a dust particle from *C*. The larger crystalline form of this figure shows to better advantage in the preceding figure of this series, indicating slower cooling. Annealing to change the dendrite structure would give this alloy a coarser grain structure than series A.

Figure 3A shows two dust particles at *C* and a number of small pits at *B*, only a few of which are indicated. Figure 3B also shows a number of small pits some of which are indicated by the arrows at *B*. Figure 4A shows a section 2 mm. from Figure 3A, which also applies to Figures 4B and 3B. This was due to the difficulty of polishing an alloy 1 mm. in length. The center of Figure 4A is decidedly out of focus, because of improper mounting or polishing. Small pits and a rupture of the film are shown from *C* and *D*, respectively. The grain sizes are increasing, owing to less rapid cooling of the center of the alloy. This fact has been shown to have a possible effect on the warpage in certain shaped castings.

Figure 4B shows a number of small pits at *B* and one point of rupture of the film at *D*. Figure 5A shows large, irregularly shaped grains, indicating that it was the last portion to solidify and so the solidified metals were forced to assume any remaining space not occupied by the metal previously solidified. The arrows from *B* represent small pits. *C* represents a dust particle; while the arrow from *X* represents an irregular dark space, the only one of its character in this photomicrograph, and therefore difficult to classify.

This portion of final solidification of the metal is of maximum importance from the metallographic standpoint. The result of improper casting is well shown in Figure 5B, which is in this last portion to solidify. The arrow from *A* shows a large cavity, which could be seen as the alloy was being prepared and was partially filled with a number of pieces of finely divided gold particles, the majority of the space being free of all metal. The finely divided gold dissolves out more rapidly than the surrounding solid metal, leaving a large cavity showing in the photomicrograph. Incidentally, the number and size of the smaller pits is greatly increased in this section. Figure 6A shows a number of small pits at *B* and one dust particle at *C*. The size of the grains is again diminishing, which indicates an increased rate of cooling.

Figure 6B shows a continuation of the large cavity at *A*. Some of the gold held in the space can also be seen. The small pits indicated at B are also in evidence.

Figures 7A and 7B represent the sprue end of the casting. The size of the grains is smaller, and they are more nearly uniform in shape. In Figure 7B, one dust particle is seen at *C*. The point indicated by the arrow from *K* shows the end of the large cavity, seen in the preceding pictures. This large cavity was more than 2 mm. in length. The seams that closed up the cavity, which were not fully melted together before crystallization took place, can be traced in the space between the small arrows.

It can be seen that no accurate comparison can be made by selecting two photomicrographs at random, if no information is given as to the methods of casting used and the location of the section. For a proper comparison, the same casting technic should be used and the entire casting examined by means of sections throughout the alloy. A comparison between Figures 6B and 3A would favor the alloy A from a metallographic standpoint, while a comparison of 5A and 2B would favor alloy B.

HIGH LIGHTS ON PORCELAIN IN DENTISTRY

By HUGH AVARY, D.D.S., San Francisco, California

(Read before the American Dental Association, Dallas, Texas, Nov. 10-14, 1924)

MORE and more, as one utilizes ceramics in the restoration of teeth, does he appreciate the unique status of this material. The dominant position that it occupies in the field of dental esthetics admits of no question; but there are other important qualities that are less well recognized. As the superior manner in which this material lends itself to the service demanded by the periodontist, the orthodontist and the internist becomes recognized, the conviction grows that the era of porcelain in dentistry is at hand.

The advantages of porcelain are manifold and striking. With no other material may the esthetic requirements be so fully satisfied. No substance is better tolerated by the tissues. The porcelain jacket crown makes possible preservation of vitality in teeth that might otherwise require devitalization for the anchorage of a restoration in some other medium.

Not only may the vitality of teeth be thus conserved, but also we hope to make clear later an even more striking fact. The pulp under a properly placed and designed porcelain jacket crown may show no difference in health over a period of a decade or more; and furthermore the pulp of such a tooth may pass through the same physiologic metamorphosis as those of adjacent teeth that are perfectly normal. These points will be demonstrated later in reference to a practical case.

If, then, a material can be shown to satisfy esthetic requirements; to possess a high degree of compatibility with the soft tissues and to lend itself to the conservation of the vitality of teeth, enthusiasm in the advocacy of its more extensive use, when indicated, seems to be justified.

But let us consider more fully the significance of these several advantages.

What does it mean to the public that modern dentistry has made available a type of restoration which vanquishes artificiality? We all know people who have been rendered unhappy for years, who have become self-conscious and ill at ease, whose success in their social and economic relations has been impaired by an unfavorable appearance of the mouth. We know also that such unfavorable appearances have frequently been the result of inartistic dental work, which may have been excusable at one time, but is no longer. It is not alone a source of gratification to the worker in porcelain that results are now possible that almost rival Nature, but there is a growing realization that it is obligatory on the dental profession to develop men capable of rendering such a service.

The tolerance of porcelain by the soft tissues is generally accepted, on clinical grounds at least; but the possibility of

preserving and restoring the contours so necessary to the protection of these investing tissues from trauma is probably less well recognized. This we will illustrate later by practical cases.

Again, let us appreciate the importance of the contribution to health and well-being rendered by the avoidance of devitalization or of the death of pulps, such as may follow the placing of large masses of metal in proximity to them. Finally, lest unwarranted discredit be cast, let us be assured that porcelain properly treated is sufficiently strong for all practical purposes.

Fig. 1 (Case 2).—Upper incisors; showing adaptation of the jacket crowns.

We may expedite the message of this paper by stating the following points:

1. We intend to demonstrate that, in certain selected cases, the decision to place a porcelain jacket crown at a given time, while it may appear a radical operation at the moment, will prove to be the most conservative treatment possible.

2. A technic will be presented for the porcelain inlay.

3. Certain aspects of the form and color of teeth will be elucidated.

4. The preparation for the porcelain jacket crown will be considered briefly. In particular, the shoulderless preparation will be vigorously condemned. It is our opinion that this procedure is unnecessary and contraindicated.

To consider these matters seriatim, let us first study a particularly illustrative practical case.

A patient, aged 15, developed a proximal cavity in the mesial of an upper central incisor. Two years later, the mesial corner of this tooth was broken away in an accident. A lingual step was then cut and the incisal angle restored, with gold. At 25 years of age, a cavity developed in the distal of this central and the mesial restoration failed. The roentgenogram revealed an apparently normal pulp. The Cameron pulp tester indicated vitality. Now was the crucial time. The tooth was either going to be so treated as to render it useful for years to come or it might be ruined.

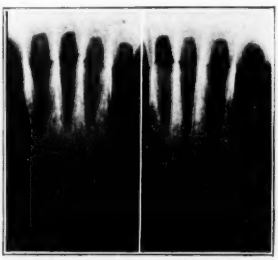


Fig. 2 (Case 2).—Lower incisors, cementum and jacket crowns; showing it is possible to have a small but definite shoulder on small incisors.

Suppose that the dentist cut the mesial cavity deeper and larger and filled the distal cavity. The larger restoration would fail in time and the tooth would then be devitalized (if indeed the pulp remained vital under the previous treatment), and a post would be inserted for retentive purposes. It is our contention that if this tooth were covered with a porcelain jacket crown properly made while there remained sufficient dentin to protect the pulp and to sustain the crown, the pulp might have remained vital indefinitely.

That a pulp will remain normal under such a crown is shown even more strikingly in the following case.

Porcelain jacket, had been placed to reconstruct two broken central incisors. The size of the pulp in these and in the adjacent teeth is shown in Figure 8. The shoulder for this

crown was cut only sufficiently to place it under the free margin of the gum, which at this age is rather high. Subsequent roentgenograms (Figs. 8 and 10) show the condition of this case ten years later. The adaptation, the freedom from any destructive changes of the periodontium, the contour and, in particular, the pulp may be noted. It will be observed that the pulp in this tooth has receded as would be expected at this later age and that its recession has paralleled that in adjacent normal teeth.

That the recession under the jacket crown would correspond so closely to that of pulps in normal teeth is truly a remarkable illustration of the compatibility of this porcelain restoration. As the gum tissue receded and the gingival outline of the crown became exposed, a new jacket was placed, with suitable gingival extension. We believe that this procedure of limiting the gingival extension at the earlier age is good practice. It doubtless materially contributed to the success experienced in preserving the health of the pulp.

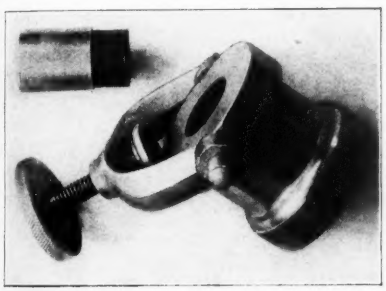


Fig. 3.—Water press (Ash & Sons), with rubber bag containing water mounted on end of plunger.

THE PORCELAIN INLAY

Indications for Its Use.—We believe that there is no type of restoration so indicated in cases of erosion, abrasion and caries at the gingival of incisors, cuspids and bicuspids as the baked porcelain inlay, and that no restoration is so plainly contraindicated as the silicate cement. Where the cavities extend under the gingival, the silicate washes out; also, since it lacks the glaze of baked porcelain, it invites the lodgment of plaques. Gold is particularly unsightly in these cavities. Finally, the lack of conductivity of the porcelain is an advantage in these sensitive areas.

Technic.—These cavities should be prepared with walls sloping slightly from the floor to the margins. The margins should never be beveled, however. It is best to extend the gingival margin 0.5 mm. under the free gingiva. The margin nearest the incisal surface should be as nearly straight as possible. This makes the inlay less conspicuous. In large gingival cavities, the floor should be convex and not flat. By cutting the convex shape, a uniform depth may be had; whereas, a flat floor might encroach on the pulp.

Fig. 4.—Three amalgam dies of gingival cavities mounted in the mental cup that fits into the water press; amalgam dies mounted in the cup with modeling compound. By using this water press, it is possible to condense the porcelain thoroughly, thus obtaining accurately fitting porcelain inlays.

The margins are finished with small stones. A piece of 30 gage copper somewhat larger than the orifice of the cavity is roughly adapted to fit over the cavity; and a hole is punched through to hold the compound, which is then heated, formed into a cone, the tip re-

heated and then forced home, carrying it to place with the copper tray. The gingival margin is burnished, and the compound chilled thoroughly. The impression is then removed and examined for sharp margins.

An indirect model is then made, copper amalgam or inlay alloy being employed. This is placed in an Ash cup that fits an Ash water press. The platinum matrix is then burnished, and also swaged, if desired. Porcelain, mixed to the consistency of thick putty, is then packed into the matrix, and

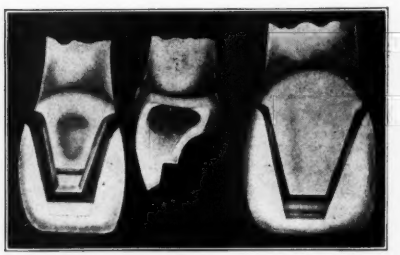


Fig. 5.—Porcelain inlay. There is a decided weakness across the incisal edge of an all-porcelain inlay of this type; therefore, it is not practical. In such extensive restorations, it would be far better to make a gold inlay with a labial inset of baked porcelain or a silicate filling, inset into the gold inlay. In many cases, it would be better to make a porcelain jacket crown, as the dentin would not be cut so deeply in making a jacket as in making an inlay, and hence there would be better pulp protection. Further, it makes a stronger and more esthetic restoration.

placed in the water press. A small round pad cut from a cottonoid pad is placed over the porcelain. The water press is then tightened down for a moment.

The mounted amalgam model containing the platinum matrix is then removed.

With a sharp lance or cataract knife, the porcelain is trimmed below the margins until the matrix is left about half full. A cross is then cut in the porcelain and the mass is biscuited. The margins of platinum are then reburnished; more porcelain is packed around and the whole is put into the water press and compressed again.

In this manner it is possible, in three or four bakings, to make quite a large porcelain inlay with excellent margins.

The porcelain is so thoroughly condensed by this method that shrinkage is reduced to a minimum.

Fig. 6.—A butt joint of enamel and cementum. This is very rare, as the cementum nearly always overlaps the enamel. (Courtesy of Dr. Julio Endelman.)

FORM AND COLOR OF TEETH

Since porcelain admits of close approximation of form and color in restoration of teeth, it is desirable that these two factors be given adequate attention so that the material may be utilized as well as possible. Many errors are observable in jacket crowns in patients' mouths, due to failure to reproduce correctly the minutiae of tooth form.

A method of detailed analysis of the anatomy of teeth originated by Dr. Vance Simonton of the University of California is particularly adapted to the minute study of the surfaces of teeth

so they may be accurately reproduced in porcelain. They are divided into three classes.

Some Aspects of the Color of Teeth.—Red, yellow and blue, which constitute the primary colors, form the bases for color blending and cannot be produced through a mixture of other pigments. It does not seem to be generally appreciated that mixtures of the three perfect primary pigments may be made to produce any color desired. If we select three suitable water-color pigments, for

Fig. 7.—Cementum overlapping enamel. This condition is almost invariably found; thus, it would be impossible, from a practical standpoint, to strip off all the enamel with instruments in making a preparation on a human tooth for a jacket crown. (Courtesy of Dr. Julio Endelman.)

instance, crimson lake, gamboge and prussian blue, and combine them in correct proportions, a very satisfactory picture may be painted; or by correctly mixing the three primary colors, a neutral gray can be made.

The color top is an useful aid in studying the possibility of color blending, showing different colored disks, which may be split on one side. Assembled, these disks show various proportions of red, yellow and blue, and will, on spinning the top, produce the illusion of mixtures of colors. This study has been found to afford excellent practical training for dealing with the color problem in porcelain work. It seems desirable that the dental college curriculum should present courses in modeling and in the study of color. In porcelain jacket crown work, the colors are blended by superposition. Sometimes, it is necessary to mix two or more colors to produce the desired hue.

The underlying color is usually orange; the next layer may be a light yellow; while the incisal third or fourth

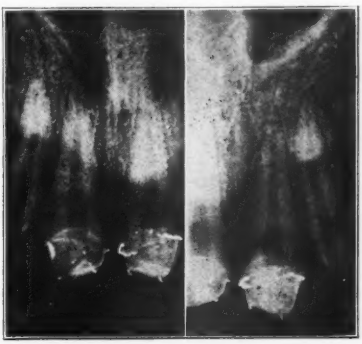


Fig. 8 (Case 1).—Appearance of the large sized pulp canals in the central and lateral incisors (patient, aged 14).

may be blue or gray. Often, in thin teeth, the darkness of the oral cavity may cast a bluish or grayish shadow on the thin enamel at the incisal. If we were to place a mouth mirror lingually and reflect the light, we might observe that there really was no blue in the enamel. Yet, in baking the jacket, it is often necessary to add a thin layer of blue porcelain to simulate the effect that is observed in the patient's teeth at a conversational distance.

THE PORCELAIN JACKET CROWN

At the Boston meeting of the National Dental Association in 1920, realizing that there was no standardized method

for classifying teeth where jackets were indicated, I presented four categories. These may be referred to in THE JOURNAL.[1] This classification is believed to be useful as a guiding factor in preparing teeth that may be in incorrect alinement.

Indications for Porcelain Jacket Crowns.—In addition to its value in cases of the type previously described, the porcelain jacket crown is also a useful medium for correcting certain anomalies in form and shape, which may occur in cases of mesial separation, especially of the upper central incisors in adult mouths when the patient does not wish orthodontic correction; in mesial or distal relations of teeth to each other, and in rudimentary lateral incisors, etc. Certain men have advocated the removal of all the enamel. Our experience has brought the conclusion that each case should be handled according to its own individual requirements. For example, an attempt to remove every bit of enamel, in treating a broken central incisor, in a patient in his teens, would generally destroy the pulp. If the shoulder, mesially and distally, is carried just to the gingivae, more dentin is left to protect the horns of the pulp. The shoulder may be carried 1 mm. under the gingival margin on the labial surface, however. This will satisfy esthetic demands. The desideratum is therefore not in the stripping of enamel *per se,* but cases should be dealt with with due cognizance of the age of the patient, the details of the case, condition of the tooth, etc. A chart of the topography of the labial surface of the tooth dividing the tooth into thirds mesiodistally and fourths incisogingivally is helpful. The location of developmental grooves, imbrication lines, defects, spots, and stains, that go to make up the individuality of that patient's tooth, must be recorded on such a chart. Unless we make such minute studies, we are in much the same predicament as the blind men of Hindustan and the elephant, and our perspective is about as accurate as theirs. The effect of the glaze as well as the texture of the labial surface makes quite a marked difference in the appearance of the jacket crown. In the imbrication marks or development grooves, the light is diffused or broken up; whereas, if the tooth is smooth and highly glazed, the high light is reflected and the tooth seems to be lighter. The

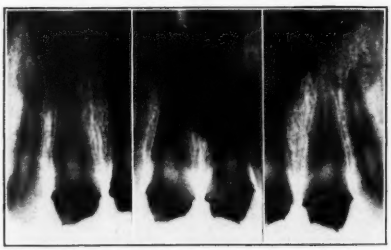


Fig. 9 (Case 1).—Condition nine years later. The same physiologic change in the size of pulp canals in the vital central incisors that were jacketed and in the normal lateral incisors may be noted.

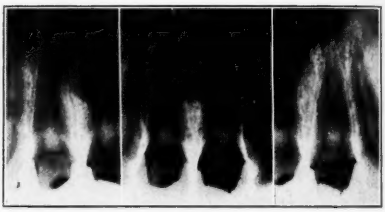


Fig. 10 (Case 1).—Appearance of the second jacket on the left central incisor, with the shoulder carried 1 mm. farther under the gingivae (patient, aged 23).

1. Avary, Hugh: Classification of Teeth as a Guiding Factor in the Correct Preparation for Porcelain Jacket Crowns, J.N.D.A., 8: 233 (March) 1921.

high light may also be modified by the form given the mesiodistal convexity of upper central incisors, the high light may be modified by this means so that, at

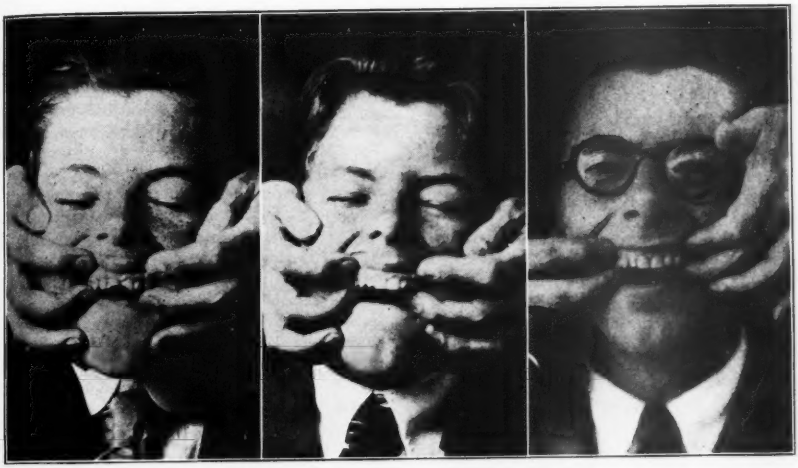


Fig. 11 (Case 1).—Left: Appearance of patient before restoration; center; after restoration; right: nine years later. The central incisors are still vital under the jacket crowns.

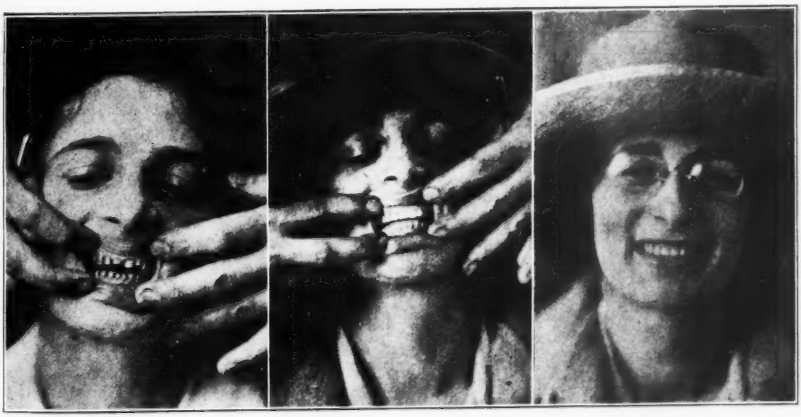


Fig. 12 (Case 2).—Left: Appearance of patient before restoration; center and right: after restoration.

labial surfaces. If, for example, we wish to close up a mesial separation between conversational distance, the finished jacket will not seem out of proportion.

THE SHOULDERLESS METHOD

As has been stated previously, we condemn this method strongly. We do not believe it is practical nor that it makes accurate adaptations at the gingivae, and we do not believe the edges sufficiently strong. It gives a false gingival contour and is careless technic. It gives a feather edge, which is weak, and a small piece may easily be broken in fitting and cementing to place. This then leaves unprotected a surface portion of the tooth that has been ground. I believe that there was never a tooth in any adult mouth, either peg-lateral or lower incisor, in which a *small* but definite shoulder could not be prepared and a butt joint obtained, which would make possible a perfectly finished jacket that would not irritate the gingivae nor endanger the pulp.

SUMMARY

A successful jacket crown depends on each step being correctly carried out in minute details; i.e., with roentgenograms and study models, correctly charted characteristics, a properly prepared tooth following out the outline of the enamel so that the preparation will look like a small edition of the tooth itself, with accurate impressions and bite; a good working model; a well burnished platinum matrix, and porcelain thoroughly condensed and fired. The tooth form should be reproduced in minute detail. The color should simulate that of the natural tooth. Then careful cementation should follow, and occlusion accurately adjusted, articulating paper being employed.

To quote Michael Angelo: "Trifles make perfection, but perfection is no trifle."

REPORT OF CASES

Case 1.—K., a boy, aged 14, had the two upper central incisors jacketed, following an accident in which the teeth were broken, as shown in Figure 11, left. The pulps had remained vital. Figure 11, center, shows the patient after restoration. The photograph to the right (Fig. 11) was taken nine years later. The patient is still wearing the jacket crowns and the pulps are vital. The left central jacket was broken in an accident, and it was a simple operation to split off the jacket and carry the shoulder of a new jacket farther under the gingivae as the patient was now an adult and the pulp had receded. The tooth responded to thermal tests, as a freshly prepared tooth would, showing to all purposes a healthy normal pulp. Figure 8 shows the appearance of the large sized pulp canals in the central and lateral incisors and Figure 9 the condition nine years later. The same physiologic change in the size of pulp canals in the vital central incisors that were jacketed and in the normal lateral incisors may be noted. Figure 10 shows the appearance of the jacket on the left central incisor, with the shoulder carried 1 mm. farther under the gingivae.

Comment.—After accidental breaking of the teeth, in children, the pulp often remains vital. It has been my experience that, if they are vital from four to six weeks after the accident, they will remain so. In such cases, it is impossible to make inlays, as a sufficient deep retentive cut cannot be made into dentin without destroying the pulp. By carefully making a shoulder preparation under the gingivae on the labial surface, leaving some enamel perhaps on both approximal and lingual sides, all the dentin that can possibly be left to protect the pulp remains. By using common sense, it is practical, and often advisable, to make jackets for such cases as this; for if one visualizes the condition of the mouth and of these teeth, say ten years hence, what may often seem at first a radical procedure will prove to be the most conservative restoration that could have been made. If these teeth had been devitalized and pivot crowns made, a blow sufficient to break a jacket crown would, in all probability have split a root that had a pivot tooth on it, then the split root would have to be extracted and the young man be compelled to wear a bridge. Now he still has two central jackets on vital teeth. This is an interesting case as it shows absolutely that there will be no pulp trouble if a practical technic is used for making jackets crowns.

Case 2.—A woman, middle aged, who was self-conscious and morbid because the teeth were all denuded of enamel, with sensitiveness to thermal shock, fruit juices, etc., had the

whole mouth reconstructed, thirty-one restorations being made: sixteen porcelain jacket crowns on the anterior teeth and bicuspids, three posterior Chayes bridges of three teeth each, and three-quarter hoods and gold jackets on the other posterior teeth. The bite was opened a little more than 4 mm. All the teeth were vital except the upper left central incisor, which had a pivot tooth on the root when the case was referred to me. The root was treated and refilled.

Comment.—In many middle aged patients, it is often advisable to open the bite. With no other restoration can the result be so nearly ideal as when the anterior teeth and often the bicuspids are built with porcelain jacket crowns.[2]

DISCUSSION

J. D. White, St. Louis, Mo.: The subject of porcelain has many interesting phases. I quite agree with Dr. Avary in practically everything he has said or advocated. Impression technic for jacket crown preparation requires a careful consideration of the physical properties of modeling compound. Tests made of confined impressions show that compound varies from accuracy as it increases in thickness. The impression of the shoulder must be accurate. There must be a definite finishing margin. I have never as yet seen a shoulderless crown that allowed one to give prophylactic treatment very successfully around that tooth. In taking the impression, there should be several steps. First, the confined compound should be carried to the shoulder, the excess being removed and trimmed. The compound is then warmed inside over a tiny gas or, preferably, an alcohol flame and carried up until the shoulder is obtained just at the edge of the band. Next the compound is chilled, warmed as before and pressed up until the band passes subgingivally to a sufficient depth to bring out an accurate reproduction of the shoulder, and thoroughly chilled before removing. I prefer copper amalgam. It is hard and retains its shoulder angles. Silver alloys do not, under repeated burnishing. The wiping-in method around the shoulder angles, gradually increasing with alloy from which excess mercury has been removed, is the preferable technic.

Dr. Avary did not say anything about the protection of the tooth during the interval between preparation and the setting of the crown. If the tooth is washed with acetone, varnished with a thin resinous varnish, then protected with a contoured aluminum band filled with guttapercha stopping and retained with a slight luting of cement, the possibility of pulp irritation will be obviated.

To those who rely on the help of the laboratory, I might say that no matter how perfect your impression technic may be, you cannot expect the return of a good crown unless you have made a chart that will adequately help the laboratory man to reproduce esthetically what you wish in the finished piece. Where increased width to fill spaces is desired, the light refraction may be cut down by creating a mat surface on the labioapproximal contour, by disking. Imbrication lines may be laid on the last packing to help break up glaring refractions.

Dr. Avary (closing): At first glance, the minute study of dental anatomy, which I have stressed in my paper, may appear impractical, but I am convinced that such a close study of tooth form will open up new and greater esthetic possibilities. Dr. White and I have many things in common. He did not see my paper previous to its presentation here. I agree with him in practically everything he said. I regret that time would not permit me to go into the detail of the preparation of the teeth. I tried, however, to give you a few of the high lights of ceramics, in the hope that you may carry home with you the realization that the era of porcelain in dentistry is at hand. May I once more emphasize the possibilities of preservation of vitality of teeth by the porcelain jacket crown; and, in conclusion, let me say that it is most gratifying to see the tremendous interest in porcelain work which is sweeping over the dental profession.

2. A patient presenting such a case was shown by me in a clinic at the Los Angeles Session, 1922.

THE CHILD'S MOUTH

By HAIDEE WEEKS GUTHRIE, D.D.S., New Orleans, Louisiana

(Read before the American Dental Association, Dallas, Texas, November 10-14, 1924)

CARE OF THE EXPECTANT MOTHER

WHATEVER alters the metabolism of the expectant mother affects the growth of the fetus. So, we are giving thought to the pregnant woman in our work of preventive dentistry. The old adage "A tooth for a child" is not an adage of my Southland alone. Many old practitioners in all parts of the country still cling to it. We must cooperate with the medical profession, particularly the obstetrician, and have them prescribe for our patients the diet necessary to assure good healthy teeth in the mouths of future generations.

In the mouth of the pregnant woman, we more often than not find a condition of ptyalism. Many times we find gingivitis, due entirely to neglect. The mouths of my private patients are seen as often as I think necessary. When my private patients become pregnant, they report to me, early in their pregnancy, for oral examination. Their teeth are put in condition and proper instructions are given as to brushing.

The mouths of the majority of clinic patients coming in for the first time are in a very bad condition, both the teeth and soft tissues. The welfare nurses usually bring clinic patients in for the first examination and treatment. The followup prophylactic work on these patients is done at home by the nurses, who refer the patients at stated intervals for observation and treatment. The work that we have done for pregnant women has not differed from that done for women who were not pregnant, and we have never had a fatality; nor have any of them had children "born with teeth;" another superstition. Why should not a mother who can masticate her food well in a clean, comfortable mouth be much better off than one who is in pain? No argument is needed over this point. Pregnancy is a physiologic process. The diseased condition of the teeth is a pathologic one, and must be corrected in order that she may have the proper care and so be enabled to bring into this world healthy offspring. From the first week on through the third month, the morale of the pregnant woman is often so low that she neglects the hair and skin. The whole body is neglected, in fact, and the teeth, of course, are neglected first. Many complain that to brush the teeth causes more nausea. We have records of cases in which the nausea was lessened by scaling and polishing by the

dentist and the systematic brushing by the patient using physiologic solution of sodium chlorid. It is remarkable how much relief is felt after the mouth is put in an aseptic condition. A marked condition of spongy bleeding gums is relieved by the systematic and proper use of the brush.

EARLY CARE OF THE CHILD'S MOUTH

The child's first acquaintance with the dentist should be at about the sixteenth month. At the second year, regular inspection begins, continuing until the stage of "immunity" is reached.

"Poets are born, not made." Likewise the God-given gift of tact in the handling of children comes to some and is denied to others. Tact is the touchstone that admits one to the sacred precincts of the child's heart and gives one his confidence and obedience. Failing of tact, we can do much by careful study of the child mind to bridge over the chasm that lies between ourselves and those chosen ones.

The child's mouth is more often neglected than given proper care. Were it not for the protection that pain brings, the neglect would be still greater. The reason for this neglect is twofold. Ignorance on the part of the parent or guardian is responsible for some part; but disinclination or inability on the part of the operator to face the peculiar conditions incident to childhood is the basic factor in a large number of cases.

In every art, there are rules that have been worked out by experience. The genius, the master mind, rises above these rules, but ordinary mortals must work by them, and gather a little here and a little there. Absolute truthfulness is essential to any sort of successful relationship. Deceive the child once, and his confidence is gone forever.

Highly strung and neurotic children usually have highly strung and neurotic parents who have systematically erred in the handling of their children. One nervous person in an operating room is quite all that is desirable at one time. It is a safe rule invariably to exclude the parents from the operating room.

If a little patient comes in with a painful tooth, an exposure demanding extraction, the operation must be done, cost what it may. Children bear a shock of this kind well and recover promptly. Be firm, be quick. The child appreciates success even more fully than the adult. Prompt success with a child is of the utmost importance in controlling him in the future. Failure forfeits his friendship. The operation should be planned beforehand and carried out so that when the child leaves the chair, he will know that some permanent service has been done.

ORAL PROPHYLAXIS AND DIET, FROM POSTNATAL THROUGH PRESCHOOL AGE

Whatever, from the seventeenth week of fetal life to the child's third year, interferes with the nutrition will interfere also with the formation of the enamel and dentin and will produce malformation. In the zone of calcification, malnutrition is manifested by transverse bands of atrophy. At the age of 1 year, the child has both the upper and the lower deciduous central and lateral incisors, and one

quarter of the crown of the first permanent molar is formed. Prophylaxis must be instituted at the eruption of the first tooth.

At 2 years of age, the child has all the teeth except the second deciduous molars, which are partly in position. The first permanent molar is about half completed. Often caries is found at the age of 2 years in the approximal surfaces of the anterior teeth. In the treatment of these lesions, by using sharp chisels the overhanging enamel can be broken away and the dentin sterilized with silver nitrate applied in saturated solution.

The absorption of the roots of the central incisors begins at the age of 4, that of the roots of the lateral at 5. Frequently, between 3 and 4 years, we find simple occlusal cavities in the deciduous molars, as well as approximal cavities. Care must be given to retain the deciduous teeth until the proper time for replacement by the permanent teeth. Abscess is frequent at this time. In my experience, this is more often noted in the first deciduous molar than in the second. Frequently, a chronic abscess with a small sinus to the buccal side is found, of the existence of which neither parent nor child is aware.

The tissues of the teeth of the child differ in no material way from those of the adult. They are quite hard enough and quite strong enough to withstand the same operations, and to carry the same fillings. Their treatment is a question of the individual—involving the differences between an immature person, with undeveloped power of reasoning and self-control, and a mature one, in whom these powers are supposedly developed.

Diseases Incident to Dentition.—Dentition may be defined as the physiologic process by which the child is supplied with teeth. It begins with the formation of the tooth germ at about the middle of the second month of fetal life, and ends with the establishment of the permanent third molars in the arch.

While the eruption of the teeth is a physiologic process, it is nearly always associated with disturbances of function which are pathologic. The process by which the tissues are forced out of the way is one of absorption under pressure. The cusps of the teeth act as the irritant that produces the stimulus to the absorption, in consequence of which the tissues are tender and painful. A hyperemic condition of the overlying tissue can be noted at a glance, as can the other phenomena accompanying inflammation. The parts become hot, and a desire is manifested to bite cold things in order to relieve pressure irritation. This is Nature's provision for forcing the gum tissue away.

Faulty nutrition, undue density of the overlying tissues or other complicating circumstances may interfere with the process of dentition, and we may occasionally encounter conditions that even endanger the life of the infant.

In examining the mouth of the infant, we should first look at the regions where, according to age, the tooth should erupt; next, we should examine for lesions on the mucous membrane, and then for the presence of an abnormal frenum.

Severe Local Inflammation.—In examinations of children's mouths, we frequently see small vesicles about 2 mm. in diameter surrounded by a

reddened zone. These soon rupture, forming ulcers with grayish bases and bright red margins. The ulcers are sunk into the tissues, and the slightly indurated margins stand above the surrounding areas. They most frequently occur on the margins of the tongue, and the inner surface of the lip and cheek. These conditions are usually associated with attacks of indigestion. Children often refuse to eat because of pain.

Treatment of Ulcers and Thrush.—We should touch the ulcer with a 5 per cent solution of silver nitrate, referring the patient to a physician for further diagnosis if the local conditions are persistent. Thrush, or parasitic stomatitis, sometimes seen in very young children on the mucous membrane, is caused by *Oidium albicans*, belonging to the yeast family and presenting branching filaments and spores. It develops rapidly in unclean mouths, especially when catarrhal conditions of the mucous membranes are present and acid fermentation of food remnants is permitted to occur. It attacks the tongue first, then rapidly spreads to all mucous surfaces, appearing as slightly raised, pearly white spots, which gradually enlarge and coalesce.

The mouth should be kept scrupulously clean, and an alkaline wash should be used to relieve the burning sensation. The general health should be taken care of by the physician, as it will be found that the nutrition is poor, presenting usually some marked digestive disturbance.

An abnormal frenum of the tongue may cause fretting and difficulty in nursing, interfering with the infant's use of the tongue in swallowing. The frenum should be removed by clipping backward with curved scissors from the under surface of the tongue and from the floor of the mouth, the tongue being held with a pair of forceps.

The technic of correcting an abnormal frenum of the upper lip is somewhat different. On the labial surface, the ligament is cut at an angle to the periosteum and down on each side to a position one-third beyond the attachment to the hard palate, and removed. The approximating surfaces on the labial aspect are sutured. After a week, the sutures are removed. It is necessary that this ligament be removed, as it is one of the causes of malocclusion as well as of pyorrhea in later years.

Diseases of Deciduous Teeth and Soft Tissues of the Mouth.—The child should be brought to the dentist the second year, as the care of the temporary teeth is of prime importance in preserving facial contour. If the child be brought early in life, no painful operations are necessary, as a rule. The dread of the dental chair is not instilled in him. As he grows older, he can be taught prophylactic measures that will materially aid him in the care of his teeth.

The deciduous teeth must be cared for in order that they may perform the functions of mastication and may be retained until the time of the eruption of the permanent teeth. The spaces must be retained so that development of the arches will not be retarded by the loss of the deciduous teeth, and malocclusion of the permanent teeth result. We rarely find malocclusion in deciduous dentures, owing to the simple and normal

habits of the child. The cusps interdigitate on eruption and maintain an important relation to the development of the bones of the head and face. This interdigitation of the cusps becomes lessened as they become flat from wear, permitting freedom in relationship of the jaws to each other, which in many cases is due to the lack of normal locking of the permanent first molar.

The deciduous teeth are not only necessary for the triturating and masticating of food until they are replaced by the permanent teeth, but they are also necessary in the development of the alveolar process and the jaw. If the mesiodistal relationship is not impaired by caries, the permanent first molar erupts posterior to the deciduous second molar and the ramus of the lower, and the maxillary tuberosity in the upper jaw. If we lose the deciduous first molar on one side of the jaw, the permanent first molar will push the deciduous second molar mesially to occupy a portion of the space vacated by the deciduous first molar. This lateral half of the dental arch will be shortened; and, with the normal lengthening of the upper jaw, malocclusion will result. There being no space retained for it, the bicuspid will be deflected bucally and lingually. The lower jaw will not develop, and a protrusion of the upper incisors or an irregular arrangement of them in the arch will result.

The rachitic and the anemic child will not have a perfect absorption. Anything that interferes to a greater or less degree with metabolism will arrest absorption. Permanent teeth are deflected in their eruption by lack of absorption of the roots of the temporary molars. This will not happen if the roentgenogram is used to determine, at the time of eruption, the cause of delay, and the proper measures are instituted according to this indication.

An abscess often occurs at the root of a deciduous molar before the enamel of the crown of the bicuspid is formed. This either interferes with the function of the enamel organ or destroys it, and the bicuspid exhibits symptoms of atrophy. There may be absorption of a deciduous tooth when there is no permanent tooth to take its place. This occurs occasionally with the lateral incisor. In all cases of delay or lack of absorption, or in any other anomaly of eruption, we should determine the cause by a roentgenogram.

TRANSITION STAGE (FROM SIX YEARS UNTIL IMMUNITY IS REACHED)

My own observations in Louisiana have shown that the average age for the eruption of the permanent teeth is from 8 to 12 months earlier than that observed in a colder climate. If the deciduous central incisor has not been exfoliated at the age of 7, a roentgenographic examination should be made of the root of the deciduous tooth, and to determine the position of the permanent one. This will nearly always show that the deciduous tooth should be extracted.

Acute abscess rarely occurs in deciduous teeth, probably owing to the more elastic nature of the child's tissues, which allow drainage with a greater degree of ease. Chronic abscess does occur, and is usually accompanied by sinus formation. Chronic abscess about the roots of the decid-

uous teeth hastens the absorption of these roots, and partly in consequence, perhaps, of hyperemia, the eruption of the permanent teeth is hastened. I have had marked success in treating chronic abscess in deciduous molars with saturated solution of silver nitrate followed by a solution of formaldehyde.

The temporary molars are often retained, owing to lack of absorption. If, by the tenth year, they are still in position, roentgenographic examination should be made.

The irritant that stimulates the osteoblasts in the absorption of the roots of the deciduous teeth also acts on the osteoclasts in the growth of the permanent teeth. Each permanent tooth is formed from a bud of a deciduous tooth, except the first permanent molar, which has its bud thrown off posterior to the enamel organ of the temporary teeth. This occurs about the seventeenth week of fetal life. At the ninth month, the follicle is complete, and calcification has begun. The second molar is derived from the outer tunic of the first, and the third molar from that of the second. The roots of the teeth are not complete until from three to five years after eruption. There are as many variations in the eruption of the permanent teeth as in the absorption of the deciduous teeth. These variations cause difficulties in diagnosis. In the proper use of the roentgenogram we have a method of overcoming these difficulties in most cases. It is hazardous indeed to undertake the devitalization of the pulps of the permanent teeth in the mouth of a child unless one has a roentgenogram disclosing the condition of the roots.

We often see imperfections in the enamel and dentin of the central incisors, cuspids and first molars due to the lack of nutrition during the period of the formation of these teeth.

The most important tooth with which we have to deal is the first permanent molar. It conceals its arrival by erupting posterior to the deciduous teeth without any inconvenience to child. It is not heralded by the exfoliation of any of the deciduous teeth. The first molar is not thought to be a permanent tooth by the laity, and is therefore the most neglected tooth and the most liable to become carious. No tooth is so often lost from inattention during the time of its development, and no tooth is more easily conserved by proper attention correctly timed. When this tooth is lost early by caries, there is a distortion of the face, resulting in malocclusion; a lack of contact of the permanent teeth, which is one of the causes of gingivitis, resulting in pyorrhea. Caries in the first molar generally occurs first in the mesial, central and buccal pits, and these cavities should be filled permanently as soon as found, the extension being carried to sharp grooves where we can obtain good finishing points. In occlusal caries involving a large amount of dentin, the excavation should be made in two sittings to avoid a nervous shock to the child and a hyperemia of the pulp, which may result. We use guttapercha. The patient is dismissed for six weeks, when the cavity may be properly excavated and permanently filled.

Pulp Exposure and Its Treatment.—Should the pulp be exposed accidentally by a sharp instrument, a

capping of guttapercha should be applied. The field must be aseptic. The rubber dam is placed, and the walls of the cavity are cleansed and wiped with eucalyptol. A guttapercha disk, held in readiness, to fit the pulpal walls of the cavity, is warmed to body temperature and depressed in the center of the surface placed next to the pulp, with no space for air or transudate from the pulp. A drop of chloropercha is placed occlusally of the disk and tapped in place. The affinity of eucalyptol for guttapercha holds it in contact with the cavity walls. The remainder of the cavity may be filled with guttapercha. A roentgenogram should be made at once and kept on record. At the end of six months, if no inconvenience is felt in the meantime and the pulp is vital, a permanent filling may replace the guttapercha filling. The irritating action of the zinc oxyphosphate, oxychlorid and oxysulphate cements on the sensitive dentin precludes their use in this location.

A pulp exposed by caries before the completion of the roots of the tooth should be extracted at once to prevent alveolar abscess or any further trouble.

Lingual pits in incisors, which are found about the eighth year, should be permanently filled. Approximal cavities in the incisors may be found at this time also, but, on account of the age of the child, these are difficult to treat; and "extension for prevention" must be used. The teeth are about one-third covered with gum tissue at this time. Great care must be exercised in excavating, as the pulps are very much larger than in the adult, and the danger of exposure is greater.

The open apical ends of roots are a menace in all operations during childhood. The pulps of the lateral incisors are larger, and more liable to exposure than in any other tooth. In consequence, difficult root fillings occur earlier than with any other tooth; likewise more mishaps.

Nothing that I have been able to state here with a fair degree of certainty could I have determined without the records I have of my cases. The information to be derived from systematic keeping of standard records by workers in this field is vast and of inestimable value. In this connection, I would like to suggest that it might be within the province of such a body as this to devise a standard case history blank, the filling out of which would result in the compilation, on a large scale, of data that would be of vast usefulness. Such a standard form, if it had the approval of this body, would quickly find its way into the hands of all who are examining children's mouths in schools, in institutions and in welfare work.

I am convinced of the necessity of filling all cavities in the child's teeth whenever they are found. If this is impossible, extraction is necessary. Very sharp instruments and a finished technic are most essential. Usually, no anesthesia is practical in the child. It is most striking how much may be done with perfect instruments in deft hands.

Our measure of success is in childhood the preservation of the deciduous denture until such time as the permanent teeth are ready to erupt. Obviously, the filling and care of the deciduous teeth are only to be accomplished by prophylaxis and removal of decay, and filling. Extraction is the

evidence of a failure to do these things, and is a last resort for the reasons cited above.

Study of the factors influencing the age eruption of the various teeth has shown that congenital syphilis hastens the eruption of deciduous teeth by a period of between six and eight months. Congenital syphilis hastens the eruption of the deciduous teeth but delays the absorption of their roots. In consequence, we see a delay in the eruption of the permanent teeth.

INSTRUMENTATION, MEDICATION AND FILLING MATERIALS

Deciduous teeth are subject to all diseases common to the permanent teeth, but in a modified form. Hyperemia results from the same causes in the child and the adult, but does not produce as severe pain in the adult. Absorption has by this time opened the root canals, and the lymphatic circulation is improved.

The treatment must always be palliative. The carious cavity should be cleansed as quickly and with as little instrumentation as possible, using a spoon-shaped excavator that will almost fit the cavity for removing the debris pressing the pulpal wall. The cavity must be dried out; a pellet of cotton saturated with Black's 1-2-3 placed on the pulpal wall, and the cavity filled with guttapercha.

In putrescent and abscessed teeth, we mechanically cleanse the canals, place a guttapercha filling and leave it for two weeks. If no inconvenience is felt, the tooth may be filled.

In caries of the deciduous teeth, we take the individual into consideration, choosing the most thorough procedure that the child will permit us to carry out. In interproximal cavities of the anterior teeth, the incisal angle is removed with a sharp chisel, and all carious dentin is scooped out with the largest spoon excavator suitable for the cavity. A broad open space is made, which will be easily kept clean by the excursion of food and fluids of the mouth. The dentin should be given an application of silver nitrate and should then be exposed immediately to the action of bright daylight. In a few minutes, there will be found on the exposed dentin a reduction of the silver nitrate and a brown discoloration. The dentinal tubules will be occluded, and caries arrested. We may often use guttapercha in the anterior teeth. In occlusal cavities, it is best to use amalgam, as this material prevents the wear of the teeth and aids in maintaining the bite until the eruption of the permanent first molar occurs. Amalgam is better than cement in deciduous teeth, as the acid in the latter is very irritating to the dentinal fibrils.

PREVENTION

At the first examination of my patients, I inquire when they last had dental attention. At every appointment, while my patients, young or old, are in the chair, preventive dentistry is preached during the examination. The patient is given a hand mirror and is shown where the cavities and diseased conditions are found and told why they exist. If the patient is too small to hold the mirror, the mother is asked to remain by the side of the chair and observe in my mouth mirror the defects found. On the first visit, the patient must bring his toothbrush and show me how he

uses it. Then, if he is missing parts of his mouth by using the brush improperly, I instruct him in my way of brushing both teeth and tissues. He is taught that every tooth has five sides to be kept clean. The brush which must first be fitted in shape and size, must be held with the bristles parallel to the long axis of the teeth, the soft tissues being brushed, with a downward sweep on the upper teeth and tissues, and an upward sweep on the lowers, inside and outside. The anterior lowers require a sweeping upward motion. The soft tissues, including the tongue and cheek, need brushing as much as does the tooth, a massage that improves the circulation and nutrition of the soft parts.

New patients are brought for observation as early as at 6 weeks, "to see if everything is as it should be." We must not allow the mother to let the child suck its tongue, its fingers or a "pacifier."

When the patient's mouth is in perfect condition, we will have determined his susceptibility and immunity to caries. An appointment is then given to him for examination and scaling.

There are few patients who can go without examination more than three months with safety. There are some that I see every six weeks. There are numbers I have seen at intervals for six, seven or eight years without having to fill a cavity for them.

After an illness of any kind, the patient should report as soon as possible to his dentist for examination.

Tubercle bacilli have been found repeatedly in the scrapings from carious cavities in children otherwise free from clinical evidences of tuberculosis. These findings may account for a considerable number of infections occurring in childhood or adolescence, and render imperative the treatment of caries in the child's mouth. Many other pathogenic organisms have also been found in caries.

Statistics have shown that the most prevalent of all human diseases is dental caries, 95 per cent of our school children being thus afflicted. These figures show also the systemic effects of caries on teeth, one of our most important units of the digestive apparatus. Impairment means that proper preparation of food is impossible, and the lack of mastication and the bolting of food result in digestive disorders and malnutrition.

In carious teeth, we find harbors for the incubation and proliferation of bacteria.

In cases of chronic abscess and pyorrhea pockets, we may have arthritis, endocarditis, neuritis, nephritis and other more or less grave systemic disturbances. If home care is properly given, and proper instructions as to diet and prophylaxis carried out, nearly 80 per cent of dental defects may be prevented.

In my opinion, as I have said, no one can go longer than three months safely without an examination, depending on the susceptibility and immunity of the patient to caries, and also on his mentality, which determines how often he should return for instruction and examination and, of course, necessary work, if any. Our aim should be the prevention of the recurrence of caries. It is our only hope for the future. The demands on us are greater each day. The more

we educate the laity, the greater the demands on us; and the higher our educational standards for us as dentists, the fewer dentists we will graduate for the next few years.

So, my solution in preventive dentistry is

1. To begin with the expectant mother, preparing her to give to her offspring a good healthy mouth and teeth.

2. To teach the mother that (*a*) oral hygiene should begin with the child at birth; (*b*) the child should be given a balanced diet, and proper mouth hygiene; (*c*) the gums must be brushed as well as the teeth; (*d*) dental inspection should be given every three months; (*e*) systematic instruction and attention to the child of the preschool age are imperative; (*f*) tooth cleaning and dental repairs must be given immediate attention when needed.

If these instructions are carried out, we will help the public as well as ourselves in limiting the reparative work necessary later on.

This preventive work is much more easily done in institutions and community clinics than in private practice. It is in the organization of community dental clinics and cooperation with our welfare nurses that we have the excellent results in oral hygiene. My first test in prevention was in our day nursery, where I treated fifty children between the ages of 2 and 4 years; and after systematic care for two years, there was not a cavity.

For the prevention of the 95 per cent diseased teeth in our school children, we must have community dental service. We cannot, in our private practice, do one-tenth of the work we can do in the clinics. We reach masses in our clinics, while in our private practice we merely reach individuals. It is in the masses that we must relieve and prevent.

DISCUSSION

Gillette Hayden, Columbus, Ohio: I am exceedingly interested in the subject of instructions to be given and care of the expectant mother because I am convinced that this period of development of the child offers us not only our first but perhaps our greatest opportunity also for insuring and safeguarding future mouth health. Whatever helps in prenatal life to bring about normal, sound tissue development is of great moment to our profession. Dr. Guthrie's first suggestion is that we cooperate with the medical profession, particularly with the obstetricians, and have them give our patients the diet necessary to make good healthy teeth in the mouths of our future generations. I approve of the suggestion that we cooperate with the physician and I should like to have Dr. Guthrie tell us in what manner she goes about collaborating with the obstetrician who has not referred the case to her. I should like to ask her what percentage of her private patients have received from their physicians any information of an educational nature with regard to diet. Possibly her experience is different from mine, which is analogous to my experience in the matter of instructions to patients by the dentist, in the personal care of the mouth. In the past ten years, since I have been paying especial attention to the education of pregnant patients in the matter of proper foods for growing sound teeth, I have found so very few who have received information from their physician that the number is negligible. In the event the physician has not instructed the pregnant woman in the matter of foods, does Dr. Guthrie supply the lack, or what is her procedure? In other words, what, in her opinion is the responsibility of the dentist in instructing patients as to proper diet for the building of sound teeth in the child and for the maintenance of mouth health in the mother? In the case of the clinic patient, does the physician or the nurse give the necessary dietary instructions, or on whom does the responsibility rest in this case?

The first requisites for the successful handling of children is to love them and be fair

to them, and the next is to retain a mental contact with your own childhood so that you have understanding. The child who becomes acquainted with the dentist and the dental office by first visiting while either mother or father occupies the chair is almost always ready to come gladly when an appointment is arranged. It is the dentist's business to see that the child enjoys these first visits and wants to come again. This is especially useful in the case of the highly organized child. The emergencies of which Dr. Guthrie speaks have to be handled as such. It has been my experience that if we adults are only agile minded we will be able to catch and follow the leads which children invariably give us, and that in proportion to our ability to follow these trends of the child mind are we successful in handling them. While the correction of defects and degenerative changes in the mouths of children is of utmost importance, the great goal before us as dentists is the prevention of diseases of the mouth. Dr. Guthrie has stressed the preventive measures which may be employed by the dental profession in avoiding the necessity for restorative operations on the teeth of children. The interest being shown in papers such as this is encouraging indeed, for it is an evidence of the thought that is being brought to bear on the sources of health and of disease of the mouth.

Dr. Guthrie: Dr. Hayden's interesting question about the diet of the pregnant woman brings to my mind the average case. The obstetrician is as a rule little concerned with the diet of the patient, and gives inadequate advice. His principal instruction is to "return in a month with a specimen of urine." We must cooperate with the obstetricians and ask that they give to our prenatal cases the necessary diet so that our future generations may have the birthright of, at least, the four healthy molars.

DEPARTMENT OF DENTAL HEALTH EDUCATION

HEALTH HABITS—BAD AND GOOD

By M. EVANGELINE JORDON, D.D.S., Los Angeles, California

(Read before the American Dental Association, Dallas, Texas, November 10-14, 1924)

FOOD

IN ALL our efforts to better dental conditions, we must think and act in terms of prevention, and my theme is the prevention of bad habits or, if you please, the substitution of good habits for bad.

Unquestionably, the worst habits from the standpoint of dental prevention are those connected with food.

When the child is unfortunate enough to have been raised on the bottle, the dentist must study habits from several angles, two of which are very important: first, the type of food that may leave lasting traces on the structure of the teeth, and, second, habits connected with bottle-feeding that may destroy the perfect symmetry of the arches.

Bad habits connected with bottle-feeding usually result in malnutrition if the food is a prepared one. The bad habit of prescribing a patented food is one of which the medical profession is not all guiltless, but it is a habit dentists must fight if the child is not to be robbed of the mineral salts and other constituents of food necessary for bone and tooth development. Unless on a very carefully prepared formula, the bottle-fed infant acquires an appetite for sugar that is going to be a habit almost impossible to break later in life. The large number of children suffering from rickets in infancy are with few exceptions bottle-fed. In the bottle-fed child, we also look for evidences of scurvy. As a result of deficient food during intra-uterine life, the deciduous teeth are badly formed, with rough, defective enamel, which has little resistance to caries. When the deficient food is continued after birth, the shape and structure of the permanent teeth are affected in the same way.

The giving of sweet, condensed milk during the first six months of life weakens the structure of the teeth. Durand, in a study of several hundred cases, found in the teeth of children so fed nearly three times as many cavities as in breast-fed children. He says the significance of these statistics is that a poorly balanced diet, high in carbohydrates, low in fat, protein and mineral constituents, fed during the period in which the teeth are developing and calcifying in the jaws, seems to have rendered them much more susceptible to decay after they have erupted.

The second danger is from habits connected with bottle-feeding. The child who retains the empty bottle and gets into the habit of pressing the nipple against the upper arch raises the hard

palate and narrows the arch in the region of the molars, bringing them into lingual occlusion with the mandibular molars.

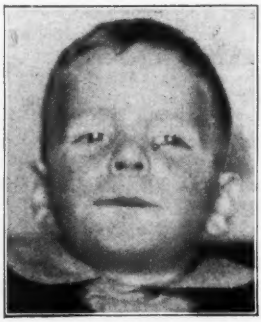


Fig. 1.—Lip-sucking in a 3-year-old child who has not malformed his denture in any other way.

Another dangerous habit often connected with, or resulting from, bottle-feeding is the sucking habit. Probably, the insufficient nourishment leaves the child in an uncomfortable nervous condition, and it soon forms the habit of sucking a thumb or one or two fingers, with disastrous results to the soft, easily bent arches.

The bottle-fed baby and the child who is brought up on mushes seldom learn to masticate properly.

When you think of giving pleasure to a child, do you not instinctively think of giving him candy? And yet the candy habit is the most destructive of the present-day habits. The few perfect dentures I have seen were in the mouths of children who had scarcely tasted candy and sugar in the first five years of life. Candy eating satisfies the appetite and gives a child a distaste for milk and vegetables. The eating of candy between meals forms a bad habit of "piecing," and a child who eats irregularly and fancifully is always badly nourished.

McCarrison,[1] in speaking of the freedom of uncivilized races from gastro-intestinal disturbances, says, of a tribe in the mountains of northern India, "Not so much sugar is imported into their country in a year as is used in a moderate sized hotel in a single day."

Another bad habit of the child is hurrying through a meal in order to play. Scolding and fault-finding at the table have a direct influence on the nerves of

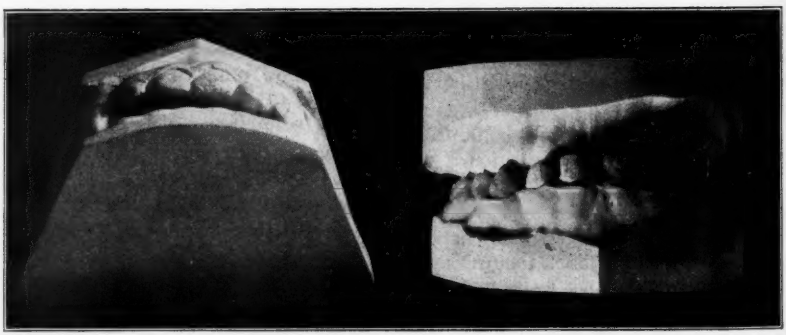


Fig. 2.—Casts of the child (Fig. 1) showing a spacing between the upper and lower dentures.

1. McCarrison, Robert: "Faulty Foods in Relation to Gastro-Intestinal Disorders," J.A.M.A., 78: 1 (Jan.) 1922.

the child and may seriously interfere with digestion.

Another habit of childhood, gum chewing, is disgusting and injurious to the health. The saliva swallowed stimulates the flow of gastric juice, which, having nothing to work on, disorganizes digestion. The gum chewer seldom thoroughly masticates his food, and his saliva being exhausted, the digestion of starches is not properly begun.

Fig. 3.—Child thrusting the tongue against the upper teeth in the first stages of swallowing.

The good health habits are the converse to the above enumerated ones.

The expectant mother should regulate her habits and diet in such a way that the proper nourishment of the fetus is assured. Great care should be taken that there is a sufficiency of minerals in her diet.

The mother should do everything in her power to nurse her infant, and dur-

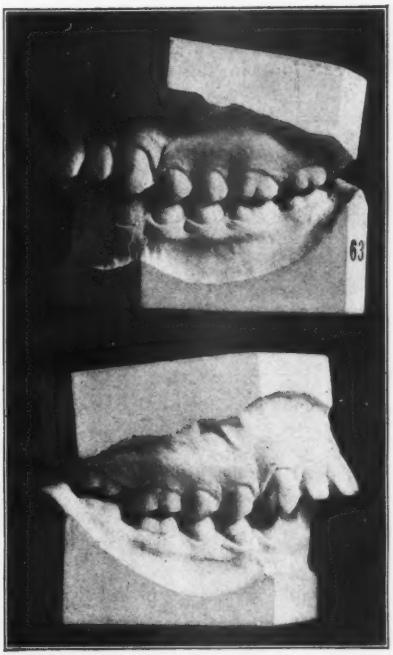


Fig. 4.—The effect of tongue thrusting on the upper teeth. This child also sucked the lower lip and slept on the sides of the face alternately.

Fig. 5.—A condition caused by tongue thrusting habits.

ing the nursing period should continue on a carefully balanced diet sufficient in minerals, protein, fats and roughage.

Fig. 6.—Child sucking the thumb while pillowing the cheek on the back of the hand.

When bottle-feeding becomes a necessity, the bottle, when empty, must be at once removed, and cup-feeding should be substituted for the bottle as early as possible.

Vegetable and fruit juices should be fed in small amounts beginning in the sixth month, and puree of vegetables

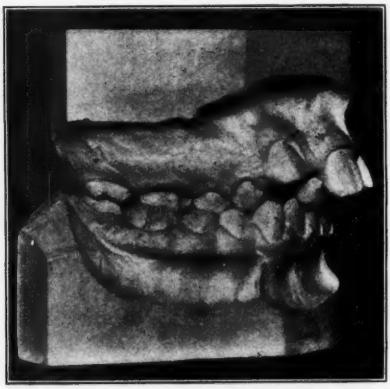


Fig. 7.—Cast showing deformed side (Fig. 6).

should be added as early as the eleventh month. In this way, the child becomes accustomed to the flavor of vegetables and when properly handled never afterward has a distaste for them. Children

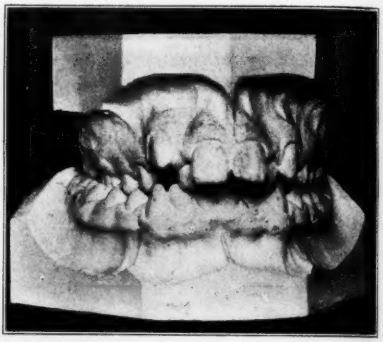


Fig. 8.—Front view of the cast (Fig. 7).

coming to me with this sort of a start show finely formed teeth with strong enamel.

Milk is, of course, a necessary part of the child's diet, and drinking a glass after each meal should be a fixed habit, continued at least until the fifteenth year.

When the teeth begin to erupt, a hard

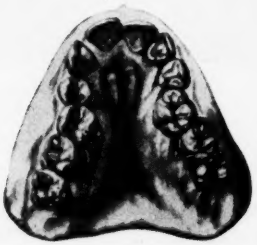


Fig. 9.—Deep vaulted form of palate . . . sometimes carried to such an extent as to suggest the idea of the two sides of the upper jaw having been forced toward each other. (Tomes.)

crust should be given the child, and from that time on, a part of the cereals should be given in the form of hard toast or dried out slices of whole wheat

bread. The child should be taught early to masticate thoroughly each mouthful before swallowing and never to wash down his food.

Children should be taught early in life that food, with the exception of an occasional apple, should be eaten at meal time, and meals should be taken regularly.

One of the best habits a family can form is to make the meal-time a merry, happy hour, with so much fun going on that the child leaves the table with reluctance.

HYGIENE

Under bad hygiene are such general habits as allowing a child to sleep in a poorly ventilated room; to form habits of poring over a book or games when he should be exercising in the sunshine, to neglect regular periods for defecation, drinking of water between meals and taking of frequent baths.

Possibly, the worst habits from the dental standpoint are connected with brushing the teeth. Habits of mouth hygiene seem to be the most difficult to teach. The average parent gives the

Fig. 10 Fig. 11

Fig. 10.—The child (Fig. 9) while at school rests this same cheek on the hands more frequently than on the other side. Figure 11—Child (Fig. 10) in more passive attention.

child a brush and says, "Go to the bathroom and brush your teeth." When I confront parents with the unquestionable evidence that many of the teeth have never received a stroke from a toothbrush and show them that where horizontal brushing is practiced, the beautiful festoons of gums have been pushed out of their proper contour and food particles have been allowed to remain

Fig. 12.—While standing, the child (Fig. 7) inclines the head in the same direction as when sleeping.

Fig. 13.—The child (Fig. 9), when sitting, inclines the head in the same direction.

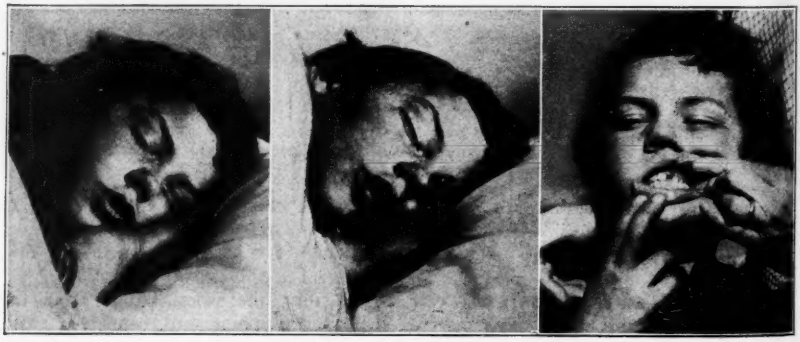


Fig. 14.—Left: Child pillowing on both hands, alternating with the position assumed in the picture in the center. Center: Pillowing in which the left hand is hidden by the right, but both hands exert pressure. Right: Results of pillowing.

between the teeth, they are greatly surprised.

The following good hygiene habits

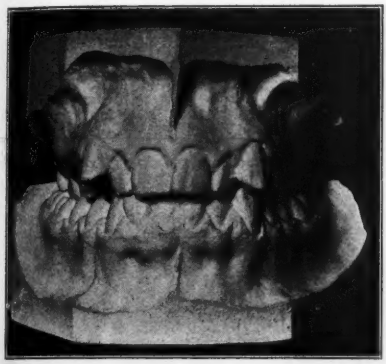


Fig. 15.—Occlusal view of worst recorded effect of hand pillowing.

add to the possibilities of a long and healthy life, with strong teeth that can be retained to the end:

Fig. 16.—The favorite pillow habit.

1. Sleeping with plenty of fresh air in the bedroom or on a sleeping porch.
2. Regular and frequent baths.
3. Drinking a glassful of water when arising and one-half an hour or an hour before meals and before retiring. The water should be spring or tap water even if it must be boiled. It should not be distilled water or melted ice, which are lacking in minerals.
4. Regular habits of defecation. If this is neglected, later in life the person may suffer from constipation. The

Fig. 17—The effect, on the left hand side, of pillowing.

breakfast hour should be early enough to enable the child leisure for this duty before going to school. The second period of evacuation should be before retiring. When such habits are neglected, the mucous membranes show a deterioration in tone, which is very noticeable around the teeth.

5. Mouth hygiene. This should be as carefully taught as any lesson in life so that retiring with unbrushed teeth would be a more heinous crime than get-

ting between clean sheets with muddy shoes. The habit of teaching children

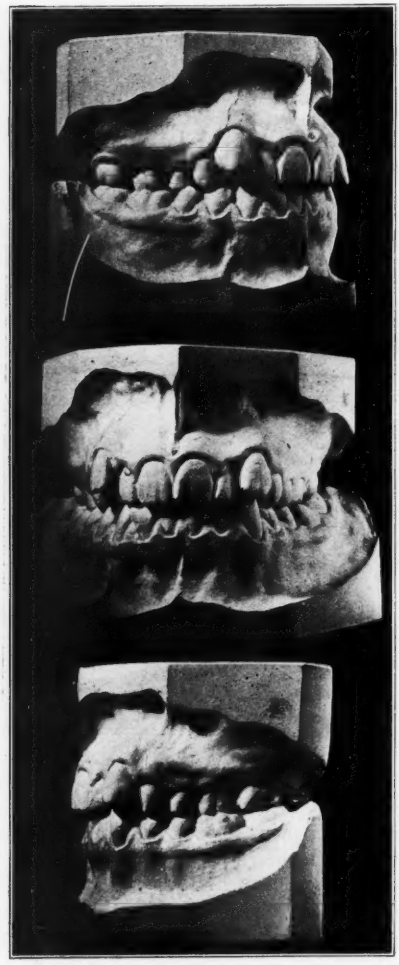


Fig. 18.—The front and side views of the cast shown in Figure 17.

to use dental pastes, powders and floss brings dire results and should be abandoned for the use of good, dry brushes used vertically with frequent washings with cold water.

POSTURE

The studies of dentists, particularly orthodontists, have established the fact that young children easily acquire habits that, if not corrected, interfere with their health during life.

In infancy, the child who is put to sleep on his face and allowed to remain in one position soon presses the soft little arches in such a way that soon they

Fig. 19.—A child, aged 7, after two years of orthodontic treatment, still indulging the habit of hand pillowing, which began at the age of 4.

are no longer in their proper relation to each other. Later, the child who forms the habit of sleeping on a hand or an arm or a rolled pillow acquires a form of malocclusion that can never be fully corrected until the habit is broken. Biting the finger nails, a bad habit acquired by some nervous children, may, and often does, cause a serious malocclusion that may baffle the orthodontist who has not studied the habits of his patients.

Infancy is the time for establishing good habits of posture, especially sleeping habits. The child should be taught to sleep on the back. His arms should be kept to his sides even if they have to

be bound as are the arms of infants of most aboriginal tribes. This will prevent sucking the thumb or fingers, which is often combined with arm or hand pillowing.

Later, the child must be carefully watched and early broken of the nervous habits of lip-sucking and nail-biting. He often must be taught correct breathing with closed lips, particularly after an operation for the removal of adenoids or enlarged tonsils.

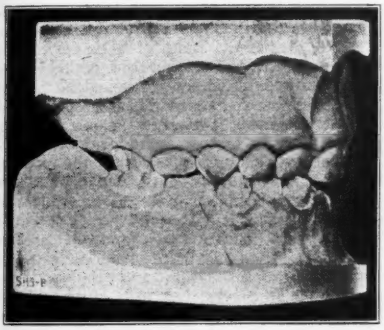


Fig. 20.—The cast of the child (Fig. 19) at the age of 4.

DISCIPLINE

The most unfortunate child is the one who is indulged and spoiled and, when fitfully corrected, does not understand why. Such a child has irregular habits, with no duties and no guidance, and often drifts into a state of poor health. Such children frequently are the wards of the Juvenile Court because, often, they were not conscious that they were breaking the laws.

One of the best habits to be taught in early life is self control and respect for the rights of others. A child who early learns self discipline and knows what he should and should not do is much happier than the spoiled, petted child who does not understand discipline.

One of the best character builders is the assignment, even to the youngest child, of some light duty for which he is held responsible. The sons of well-to-do men who conduct paper routes after school seldom have time to commit the petty crimes that get idle boys into the hands of the police.

CONCLUSION

I should like to speak of a national habit of accepting advertisements as guides in life. In a recent paper, I read of a beauty doctor who was indicted for the death, from infection due to careless operations in face-lifting, of one of the wealthy clients who flocked to her because she advertised herself as a most successful beauty doctor who had practiced extensively both here and abroad.

The worst phase of this acceptance of advertisers is connected with the food habits of the nation. Dr. Jackson[2] tells us that the subconscious mind is open to suggestion; that, even at his best, man is extremely susceptible to the contagion of ideas, and that most of us are less immune to this mental contagion than we are to colds or influenza.

After we have read half a hundred times that a certain soap floats, a fair proportion of the population is likely to be seized with the desire for a soap that floats, not because they have any good reason for doing so but simply because the suggestion has "taken."

Riding on a street car the other day, I read these advertisements arranged in the following order:

1. Snow white flour. Good flour makes goodies. (With a picture of a little girl reaching for cookies.)

2. Someone's cocoa. Nature's most nourishing beverage.

3. A • chewing gum. After every meal—good for teeth, breath and digestion.

4. The Family Laxative.

2. Jackson, Josephine A., and Salisbury, Helen M.: Outwitting Our Nerves. A Primer of Psychotherapy. New York, Century Company, 1921.

One wonders whether the man who put them up in this order had a sense of humor. First, there are cookies made of flour robbed of most of its mineral salts. Second, a boost of Nature's best beverage, ignoring the fact that milk is the best beverage and that the only logical excuse for using cocoa is to induce a child to drink more milk. It is amusing that, after washing down sweet, starchy cookies with a hot, sweet drink the discomfort and restlessness of the child should have *suggested* chewing gum. And of course need of a laxative is the result of eating food with no roughage.

Riding twice a day in the street car, how long is the average person going to escape the contagion of most of these proprietary food ideas? Even when the tired person picks up a popular magazine for his evening relaxation, he is again confronted by some of these alluring pictures and food suggestions.

The worst phase of this acceptance of the suggestions advertised is the bad food habits, which are taking a toll of the health and strength of the people. These bad habits can be corrected by education in teaching the difference between denatured foods and fresh, natural foods.

Another habit, as witnessed by the magazine covers of the December 1921 *Literary Digest* and the September 1924 *Ladies' Home Journal* is the mistaken idea of beauty. Let the dental profession raise a protest when a picture of a child sucking its thumb or sleeping with an empty bottle in its mouth is held as an ideal of beauty.

DISCUSSION

Wallace Seccombe, Toronto, Canada: I am in general agreement with Dr. Jordon. The question of the use of the toothbrush is an interesting one. I quite agree with Dr. Jordon that it is most important that it be used properly and that great injury results from its improper use, but I should not go so far as to say that the dentifrice should be eliminated. I look on toothbrush and dentifrice as toilet necessities, the one being the natural complement of the other.

These accumulated masses or films or deposits on the teeth are made up largely of mucus, but in addition fat. Fat and protein unite very freely, and deposits on the teeth are of a fatty, mucinous nature. It is for this reason that a soap-containing dentifrice does clean the teeth. There is a saponification of the fat that is of advantage. We should get away from the term toothbrush because the value of the brush is in its proper application to the soft tissues of the mouth as well as to the hard. The massaging of the gums through the excursion of the brush over the gum tissues and sweeping over the teeth is one of the most important reasons for the use of the brush in the mouth.

May I in conclusion stress one point touched on briefly in the paper, namely, the calcification of the teeth from the standpoint of preventive dentistry. Some of these permanent teeth are calcified during the period before birth and immediately following birth, and when the first permanent molar erupts with a fissure, rendering it more susceptible to caries, we must think of that fissure and the formation of that fissure in terms of the prenatal and lactation periods. and in doing that we approach the subject from the standpoint of real prevention. A fissure brings about a condition of salivary stasis, and we have the retention of carbohydrate material with the consequent fermentation and the acid by-product. To prevent that area of marked susceptibility we must think of the time of calcification.

E. S. Park, Jacksonville, Texas: I think every dentist should practice preventive dentistry. I differ with Dr. Jordon a little about preventive dentistry. She went back to the point we all start from, prenatal life, where preventive dentistry should be started, and I think every mother and every woman who expects to be a mother ought to first read McCollum's book on diet. Every dentist ought to teach the mothers while working on their teeth, telling them to read that one book and learn to develop the teeth properly. All of our first teeth and quite a few of our permanent teeth are formed in that stage of life, and in that period the lime salt is laid down and helps to close the fissures and grooves. Another thing about the care of teeth: I don't think a child under 6 years of age should be sent to the bathroom alone to brush his teeth. I think the mother or father should take care of the teeth until the sixth year. As for using paste, I think the teeth should be brushed after each meal. After the first two meals, there is no necessity for using tooth paste, but at night I think it should be used thoroughly. I think the vertical movement is not the best movement to use to brush the teeth. I prefer a sweep-

ing movement, the upper teeth being swept down and the lower teeth up. As long as you sweep the upper down, you are all right. When you come to sweeping them up, you force the gum back.

Guy S. Millberry, San Francisco, Calif.: The best answer to this sort of problem can be paraphrased in the old adage, the proof of the pudding is in the eating thereof. Having listened to Dr. Jordon's opinions on this question on several occasions and having seen the results in her practice, I am convinced of the soundness of her arguments. I think she has proved conclusively that she has been able to render a valuable service to that sadly neglected group, the poor little rich children, as well as those among the middle classes, for her educational work is not confined to the few.

With the assurance of conviction that has commanded respect, she has crossed swords with family physicians and pediatricians on the question of diet and nutrition and won out in establishing a dietary regimen that safeguards the teeth and other osseous tissues.

The best answer is that mothers accept Dr. Jordon's advice, and the children's teeth are preserved.

With regard to dentifrices, I believe we all need some specific information in the matter. We do not know what effect dentifrices have on the teeth and tissues of the mouth, and we prescribe them merely because of personal preference or because of specious advertising.

Would it not be advisable for this section to recommend to the Trustees and the Research Commission that a thorough and continuous research be made of the various chemical and pharmaceutical preparations including all dentifrices so that we may know which are beneficial and which are harmful?

Most of you are familiar with the work done by the American Medical Association on proprietary compounds and new and nonofficial remedies. We need this service too.

Dr. Jordon (closing): As a child, my most cherished playmates were hound dogs. I early learned the feel and look of their teeth. The mouths of the older dogs were wonderfully clean. When I was doing my college work, wanting more practice at extraction, I got permission to go to an orphanage, and I was horrified to see the state of the teeth of the children. I had always suffered from bad teeth myself, because not being strong I had been given quantities of iron. I wondered why children's teeth should be so much worse than animals' teeth. In my early practice, conducted in a residential neighborhood, I frequently saw pet animals, and I have never seen anything worse in the way of pyorrhea or caries than in the mouth of angora cats and small dogs, because they are kept on an artificial diet that does not require any mastication. None of these hounds used tooth powders, or pastes; all of them were absolutely ignorant of the use of dental floss, and still their mouths were perfect. I started with the idea of "Let's go back to Nature," and, answering Dr. Seccombe, I believe if we could get people to finish a meal with an apple or with a salad of lettuce or cabbage, it would be unnecessary for them to brush their teeth. I do not permit the children under my care to use either paste, powder or floss, but neither do I permit them to use white bread or drink chocolate. If we find we cannot break patients of such bad habits, they have to go to somebody who is willing to cope with resulting miserable conditions. The child that goes to school and has an hour for his midday meal and wants to play three-quarters of that hour out in the air with somebody who is going to beat him at ball, is not going to do any tooth-brushing. My particular reason for not using tooth pastes or powder is that the young child objects to the flavor and the powder getting into his throat. I always find if my patients have been away from me for a few months, they drift back into the habit of using a dentifrice and neglecting their molars. After 12, you can teach them anything you please, but I am talking about the children from 2 to 12, and I do not have them use paste or powder if they are coming regularly for prophylaxis. If they are not, I teach them to use some sort of paste or powder once a week to clean off the deposit that forms on the teeth. But as for dental floss, nobody is ever going to convince me that it is right, because the tight contacts of the teeth are the protection of the gums, and the hard, firm tissue protects the surfaces of the teeth in the interproximal spaces. Dr. Daugherty of Toronto laughed at the idea of having to polish the interproximal spaces. If the child is on the right kind of diet, the spaces need no polishing. Chewing gum I spoke of in my paper. I think it is a disgusting habit.

One needs only to look at the postmarks on some of the letters that come into the office of the Department of Dental Health Education to realize that a spotlight is shining on preventive dentistry in many countries. Within the last month, requests for material, including reprints and posters, have been received from Australia, Holland, Germany and Belgium. Doubtless an exchange of ideas and methods would broaden the horizon of all of us. It is hoped therefore, that we in time will be able to announce some of their material, and report their methods and results.

RECENT DEPARTMENT ACTIVITIES IN THE FIELD

When one attends three dental meetings in succession, she comes back to her work so full of enthusiasm and ideas that she feels she must pass some on to others. Of course, I naturally viewed all of the conventions from the preventive dentistry and educational aspect. Clever crown and bridgework may have attracted my attention and admiration, but it was exhibits and papers on the conservation of teeth over which I lingered. At the Illinois State Dental Society meeting, a unique plan was worked out in the way of clinics under the heading of "The Seven Ages of Man." To cover the period of infancy, when feeding is most important, a clinic on diet was presented; under childhood, we found clinics on orthodontia, exodontia, copper cement fillings, etc.; while a consideration of the dental needs of adult life offered an opportunity to emphasize all phases of dentistry. There was an extremely interesting and instructive exhibit under the auspices of Dr. C. Carroll Smith, full-time school dentist in Peoria. Dr. Smith showed the card system used in his dispensaries, displayed some excellent posters, which were made by the school children of Peoria following out ideas received from his educational work, and had some of the children present in order that those interested might see the type of dental work that is done in the schools. A visit to one of the schools was an inspiration. Here the children in the third grade gave a dramatization of a fairy story which Dr. Smith had told them previously. They also showed a set of slides illustrating the story, made from figures torn out of paper, placed between glass and bound by the children. Dr. Olive Read presented in an interesting manner a chart showing the method of procedure of the educational work in the Chicago schools, while Drs. Vander Wolff and Taggart had a graphic exhibit showing the best toothbuilding foods and the time of eruption of the teeth. At one of the general sessions in the evening, Dr. Wallace Seccombe of Toronto gave a talk on "The Part Which the Layman Can Play in a Mouth Hygiene Program." He made the timely suggestion that the ultimate goal of every state dental society should be to see that there is a full-time state dental health officer under the auspices of the state department of health or state department of education.

The week following the Illinois meeting, there was a splendid meeting of the Indiana State Dental Society in Indianapolis. Mrs. Whitcomb, who is the head of the health teaching in Omaha, Nebr., gave a talk on health education from which one gained a clear idea of the many factors that enter into health teaching and the place that dental health holds in health education. Dr. Willis Sutton, of Atlanta, Ga., who already has so many friends in the dental profession and who has done so much to arouse the profession to the educational responsibility which it has, delighted and inspired his audience. Copies of Dr. Sutton's address at Dallas may be obtained by writing to the Department of Dental Health Education of the American Dental Association. During the school year the Indianapolis Dental Society, through its Mouth Hygiene Committee, of which Dr. Mary Westfall is chairman, conducted a poster campaign on dental health in the schools. Three prizes were given to the various schools and all of the prize-winning posters, as well as others, were shown at the meeting. It was encouraging to note the number of men who showed keen interest in the posters.

A trip to Canada was indeed a treat. The spirit shown at the meeting of the Ontario Dental Society was enviable. There is, of course, the alma mater spirit added to the professional, for most of the men are graduates of the same college, so that one was conscious of the get-together feeling immediately. Canada has recently organized a Canadian Dental Hygiene Council, of which Dr. Harry Thomson is field secretary. During the last eight months, Dr. Thomson has traveled from coast to coast, bringing to the minds of Canadian dentists the idea of their responsibility in the health problem of Canada. The Province of Ontario is to be congratulated on having recently appointed Dr. Fred Conboy as full-time Provincial Director of Dental Services; while Toronto is fortunate in having as its dental director Dr. Edmund Grant, under whom all of the educational and dental service is conducted.

At all three meetings, the Department of

Dental Health Education presented an exhibit of the educational material that is now available for distribution, and talks on the fundamentals of dental health education were given before the societies. While this was admirable, I feel that the personal touch was even more valuable. I had the opportunity of meeting many men and of explaining to them the service that we are now able to render and that which we plan to develop in the future. After feeling the pulse of the profession in this way, we cannot help but feel that many men are interested in educational work and are anxious to carry on. We cannot do this alone, so that we want you to hear the "cry from Macedonia."—Send in papers, reports, ideas, methods and material on dental health education in order that we may publish them in THE JOURNAL and in that way help other people to keep the ball rolling.

EVELYN C. SCHMIDT, *Director.*

REPORT OF BELFAST ORAL HYGIENE DEMONSTRATION

The Maine State Department of Health, Division of Dental Hygiene, last spring, carried on an oral hygiene demonstration in Belfast to interest the people in Oral Hygiene and to show how other communities are handling the problem of caring for their school children's teeth.

Belfast was selected for the demonstration because it is a progressive and up-to-date city and consequently much interested in the welfare of its children.

The demonstration commenced with the children of the Pierce Primary school. The mouth of every child (188) was examined, and four children from each of the six primary grades were given prophylactic treatments.

The average number of cavities was found to be three and four-tenths. Three children were found with seven cavities each in their permanent teeth: one child was found with eight cavities and one with nine cavities. Two children had ten cavities each in their deciduous teeth, one had eleven cavities, four had twelve cavities each, one had thirteen and one had fourteen. Twenty-four per cent of the children needed no reparative work.

The second school visited, the McClellan Primary School, draws a larger percentage of children from a somewhat poorer class of homes than does the Pierce School. Here 212 children were examined.

The average number of cavities was found to be four. Four children were found with five cavities each in their permanent teeth; one with twenty cavities in its temporary teeth, one with sixteen, four with twelve cavities each, two with eleven cavities each, and one with ten cavities. Thirteen per cent needed no reparative work.

From this school four children from each of the six primary grades were given prophylactic treatments.

The Crosby High School students were next examined, 243 in number. Forty-three per cent needed no reparative work.

The average number of cavities was one and five-tenths.

An individual class study showed the following needing no reparative work; seniors, 48 per cent; juniors, 52 per cent; sophomores, 44 per cent; freshmen, 34 per cent.

Eight of the Crosby High School students were given prophylactic treatments.

The Crosby Junior High Schol students—seventh and eighth grades, showed a percentage of 40 needing no reparative work. The average number of cavities was 1.9. Fifteen students from Crosby Junior High were given prophylactic treatments.

A survey of one special class of children retarded by physical handicaps showed 25 per cent needing no reparative work. The number enrolled in this class was 24. The average number of cavities was 2.8 cavities per mouth. As these children are not mentally equal to normal children their teeth are not so well cared for, and should have special effort concentrated upon them.

A "Modern Health Crusade" has been introduced into the school, in which the children are taking a great deal of interest. As part of this crusade, every child has been supplied with a toothbrush and toothpaste by its parents or through charity.

Other activities of the demonstration included a lecture to the students of the Crosby High and Junior High on Oral Hygiene and the Care of the Teeth, February 11. February 14, the film "Your Mouth" was shown at the three regular shows at the Colonial Theatre; on Monday evening, February 16, there was a mass meeting at the Crosby School.

A short talk was given February 17, before the Belfast Business and Professional Women's Club explaining the purpose of the demonstration.

February 24, there was a moving picture shown at the Crosby school for the children

of the primary grades at which dental hygiene films were shown.

February 25, three boys came over from Searsport for prophylactic treatments that they might carry home some first-hand information of the demonstration.

Prophylactic clinics, held each afternoon and Wednesday and Thursday evenings, were open to visitors at all hours and many of the townspeople showed their interest by visiting the clinics. The dentists and school officials were interested through it all.

The Belfast Public Library arranged a conspicuous display of non-technical Dental Hygiene books and called attention to them in their notices, and merchants contributed space in their windows to advertise the demonstration.*

*This report is in substance the report submitted by Dorothy Bryant, Director Division of Dental Hygiene, Maine State Department of Health. The complete report may be had on application to Miss Bryant.

FIELD NOTES*

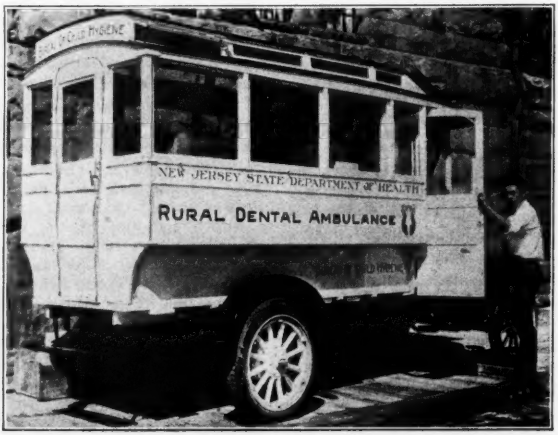
Miss Bowden Hudson, state supervisor of mouth hygiene of the State of Mississippi for the past three years, resigned June 1. Miss Gladys Eyrich has been named as Miss Hudson's successor. A motor truck equipped with a Delco Motion Picture Outfit and an experienced operator is being equipped and will be used in teaching mouth hygiene throughout the state.

*The Department of Dental Health Education will be glad to receive items of news along the lines of education in dental or general health.

The Mississippi State Dental Association and the State Board of Health have endorsed and will put on a state dental health week October 26 to 31, 1925, inclusive. All details will be arranged by a special committee of five, which will appoint subcommittees in each county. A statement relative to the objects of the week will be sent to the president and secretary of every organization in the state, every minister and school superintendent. Articles will appear in the daily and weekly papers, the teachers' journals and the parent-teacher bulletins.

During the summer session at the University of Michigan, Dr. Russell W. Bunting will give a series of lectures on oral hygiene under the following headings:

1. The Significance of Diseases and Malformations of the Mouth.
2. The Relation of Dental Diseases and Malformations to the Development of the Child.
3. The Diseases of the Mouth.
4. The Care of the Mouth and the Methods of Preventing Dental Disease.
5. Mouth Hygiene as a Public Health Measure.



Exterior of the dental ambulance of the Bureau of Child Hygiene of the New Jersey Department of Health.

The Journal of the American Dental Association

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Please send in promptly notice of change of address, giving both old and new. Important information regarding subscription price, etc., will be found in the advertising pages.

Editorial

THE COMING MEETING AT LOUISVILLE

The attention of our members is called to the program of the 1925 meeting in this issue. Everything seems most favorable for one of the greatest meetings in the history of the organization, and all that is required to set dentistry in this country one more step forward is a record attendance.

The chairmen of the sections are working with a will, and, as will be seen by their various programs, they have in prospect the very latest developments in progressive dentistry. The chairman of the clinic committee is also getting his work well in hand, and the meeting is thus assured of a practical value in addition to the inspirational impetus that every member must get from attending such a gathering. The local committeemen are uniting as one man to provide a suitable setting for a really great meeting, and they confidently promise us the best possible facilities for staging the different activities of the Association, no matter how large the attendance may be.

The general meetings promise to be unusually attractive. Assurance is had of the presence of some of the ablest speakers in America, and it remains only for the final confirmation of a promise tentatively given on the part of one of them for us to make an announcement that will surprise and please our members.

Altogether, the literary and clinical features of the meeting will be amply provided for, and no man need have any fear that he will go to Louisville without carrying away with him an ample recompense in the way of inspiration and concrete knowledge.

The location of Louisville is the most central of all the large cities in America, and it is therefore within reach of all. The attractions are varied and unique. The city is in easy driving distance of Mammoth Cave of wide renown, and of one of the most hallowed spots in all American history—the birthplace of the immortal Lincoln. Every American citizen should make a pilgrimage to this sacred shrine, and the Local Committee is making arrangements whereby this can be done with the greatest ease and comfort. To anyone who has never visited this spot, the incentive should be great enough to take him to Louisville regardless of the attractions of the meeting itself. The name and fame of Lincoln are looming larger on the horizon of American thought with each succeeding generation, and we as dentists should never lose an opportunity to contribute our meed of reverence to the memory of this sublime personality. Let us go to Louisville and to Lincoln's birthplace, and thereby receive inspiration for renewed consecration to the ideals of the highest type of American citizenship.

We feel that the entire setting for the meeting of 1925 is most propitious, and we strongly urge every member to begin now to make preparation to attend. We confidently pledge on behalf of the official family our best efforts to provide a meeting that will prove an uplift not only to the individual but also to the profession as a whole.

C. N. Johnson.

DELEGATES' CREDENTIALS

Delegates' credential certificates will be sent to the secretaries of all state associations, Aug. 12, 1925. The state secretaries will see to it that these certificates are signed and delivered to their respective delegates. It is necessary for each delegate to present his credentials, properly signed, to the Committee on Credentials at Louisville in order to be properly enrolled by that Committee, before he can be seated in the House of Delegates.

WHO MAY REGISTER AT LOUISVILLE

The Constitutional and Administrative By-Laws of the American Dental Association give specific instruction that the General Secretary is not to issue an admission badge to any dentist living in the United States, or its possessions, who is not a member of the association.

Admission to Meetings: Section 1.—Admission to all general sessions, section meetings and clinics of the Association shall be limited to those persons who have received the official badge of the society, issued by the General Secretary.

Section 2.—The General Secretary shall issue membership badges to such members on presentation of their membership cards, or satisfactory evidence of the fact that such cards have been issued.

Section 4.—Guest badges may be issued to all visiting dentists from other countries, to physicians and to nondental friends of members, at the discretion of the General Secretary.

Section 6.—A guest badge may be issued to legally qualified practitioners of dentistry residing outside the United States and its possessions who present membership cards of recognized dental associations of their provinces or national organization from the country in which said member resides.

It is also very important that every active member bring his 1925 membership card, in order to avoid confusion and delay at the registration window.

OFFICIAL CALL

The Official Call of the Sixty-Seventh Annual Session, at Louisville, the preliminary program, announcements, etc., will be found in another department of this the special Louisville number of THE JOURNAL.

Medical and Dental News

California

Dr. Avary Honored: Dr. Hugh Avary, of San Francisco, has been invited to conduct a postgraduate class in dentistry in Paris, France. He sailed from New York, June 27. He expects to give a paper before the American Dental Society in London the latter part of July.

Connecticut

Connecticut Dental Hygiene Association Meets: The eleventh annual meeting of the Connecticut Dental Hygiene Association was held in Bridgeport, May 8. Addresses were given by Dr. Arthur Fones, Bridgeport, Dr. Hermann Prinz of the Dental School of the University of Pennsylvania and Miss Anna Deplanter of the Philadelphia Children's Health Society. The convention closed with a dinner. Officers elected were: Miss Helen Rosenthal, Bridgeport, president; Miss C. Louise Harris, New Haven, vice president; Miss Anna Maher, Bridgeport, secretary, and Miss Virginia Case, Hartford, treasurer.

Hartford Dental Society Meeting: At the annual meeting of the Hartford Dental Society, Dr. Floyd P. Jones was elected president; Dr. Willis F. Abbey, vice president; Dr. Walter D. Bray, secretary, and Dr. Wilson R. Conran, treasurer (reelected). Following the business meeting and dinner, Dr. Samuel Supplee of New York City gave a clinic on partial dentures and removable bridges.

Hawaii

Officers of the Dental Society of Hawaii: The following are the newly elected officers of the Dental Society of Hawaii. G. R. Marsily, president; J. R. Wikeen, vice president; H. I. Kurisaki, treasurer; Allen Harwell, secretary, all of Honolulu.

Illinois

Northwestern Home Coming Clinic: The home coming clinic of the Northwestern University Dental School was held June 11-13, under the auspices of the alumni association. A comprehensive program of papers and clinics was given, and a joint reunion of all departments of Northwestern University was held June 13. A visit to McKinlock Campus was a feature of the home coming.

Ground Broken for Northwestern Additions: Friday, May 8, ground was broken at Chicago Avenue and Lake Shore Drive, Chicago, for the McKinlock Memorial Campus, comprising 9 acres. Mrs. Montgomery Ward, who has contributed $3,000,000 for a medical-dental center, was president, with Mrs. Levy Mayer, Mrs. George R. Thorne, Elbert H. Gary and William A. Wieboldt, donors, respectively, of the Levy Mayer Hall of Law, Thorne Auditorium, Gary Library and a $500,000 gift toward completion of the school of commerce building; and George A. McKinlock, whose gift made possible the purchase of the campus site. In all, the buildings proposed will cost $7,000,000.

Founders' List of Medical Arts Club: The last $1,000 life membership in the Medical Arts Club, Chicago, was reserved and granted to Otto U. King, secretary of the American Dental Association, and the second group of life memberships was opened at $1,250. The entire Founders' list is now being rapidly completed. Members of the invitation committee have reported increased interest in the special charter and annual plans of membership recently. Suggestions sent to the Board of Governors by the Founders bid fair to make of the club a stronger professional center than even the

board themselves had dreamed it would be. Men who have traveled throughout this country or studied in Old World capitals are suggesting features found in similar clubs and academies elsewhere. New ideas such as that of a radio broadcasting station for health news have been brought forward. The Founders all see in the institution one step closer to a great medical center in Chicago.—Medical Arts, May 15, 1925.

IOWA

Iowa Child-Welfare Research Station: The Iowa Child-Welfare Research Station, University of Iowa, has received a grant of $133,500, of which $100,000 is to be used in supplementing and extending the research program of the station during a period of five years. An allotment of $30,000 will be expended during a period of three years for parent-training work in three cities in the state, in which the work of the extension division of the University of Iowa will cooperate. This will be an expansion of child-study work already being conducted in 19 urban and rural districts of Iowa and will be coordinated with similar field activities of Iowa State College at Ames and Iowa State Teachers College at Cedar Falls. Equipment for the preschool laboratory of the Research Station will be secured with the remainder of the grant.—School and Society, May 2, 1925.

School Inspection of Teeth in Oskaloosa: At the close of the last school year as no inspection had been given previously, it was decided to give the students the benefits of an examination before the summer vacation so that they could have all defects taken care of before the opening of school again in the fall. All dentists of the town agreed to give two hours or more for examinations of the students, who were allowed time from their studies to go to the dental offices. Each student was given a card showing the work that was needed to put his teeth in good condition, and as individual advice and instruction was usually given him also, the educational phase of the work was not neglected. In the followup work the next school year need of regular dental care, daily prophylaxis and diet were emphasized. Of the 90 per cent of pupils needing dental work, 38 per cent had all taken care of, 12 per cent had part of the work done, 8 per cent are having work done at the present time, and 31 per cent had nothing done. Arrangements have been made to have the work of those unable to pay taken care in the Junior Red Cross dental clinic.—Esther M. Albright, in Hygeia, May 1925 (abstr.).

KENTUCKY

Church Child-Welfare Work in Louisville: A survey of the institution population of the Episcopal orphanages in Louisville, Ky., by the secretary for institutions of the National Council, Department of Christian Social Service, has resulted in the adoption of a progressive policy in child care by the Episcopal orphanages, and in the participation of the church group in a community child-welfare program. Through the cooperation of the board of directors of the girls' orphanage, the Family Service Organization, and the Community Chest, a Children's Bureau has been organized under the support of the Community Chest to serve any institution which cares to avail itself of the service. All applications for admission and discharge and all case studies of the children in the boys' and girls' orphanages are made to the Children's Bureau.—Miss Marion Barney, in Fourth National Social Service Conference Proceedings, Leaflet B, 1924, The National Council, New York.

MASSACHUSETTS

Malden Studies in Health Education: In 1924, the following letter signed by the grade teacher was sent to 300 parents: Dear Parent: Health teaching was organized at the Faulkner and the West schools nearly three years ago as a new aid in improving the health of the children. We are anxious to know to what extent health teaching has been carried into the home life of the child. If you are willing to help us by giving the information requested below, we shall appreciate it. Eighty per cent of these questionnaires were returned. Three or four were not filled out but carried some such statement as "I approve of all this." But 233 of these questionnaire letters were filled out completely by "yes" or "no" answers. There follow the questions and the judgment of the parents as to results:

Is your child

Going to bed earlier? Yes 129. No 104.

Spending more time out of doors? Yes 198. No 35.

Keeping himself more clean? Yes 196. No 37.

Brushing teeth more regularly? Yes 146. No 87.

Drinking more milk? Yes 169. No 64.

Eating more vegetables? Yes 176. No 57.

Eating more fruit? Yes 194. No 39.

Eating more cereals? Yes 103. No 130.

Eating less candy between meals? Yes 156. No 77.

Eating foods which he had refused before? Yes 141. No 92.

Standing and sitting in better posture? Yes 149. No 84.

Has your child improved in health appearance as shown by bright eyes, clear skin, good color, etc.? Yes 177. No 56.

Do you think there has been a real improvement in health? Yes 186. No 47.

Have you noticed improvement in any of the following ways as a result of better health: More cheerful and good natured in disposition? Yes 151. No 82. More completely rested in the morning and willing to get up promptly? Yes 150. No 83. Better appetite? Yes 171. No 62.—C. E. Turner in Am. J. Pub. Health, May, 1925.

Advisory Executives of 7th International Congress: The following have been chosen as officers of the Massachusetts Advisory Committee of the Seventh International Dental Congress: President, Henry H. Piper, Boston; first vice president, Charles M. Proctor, Boston; second vice president, Frank P. Barnard, Worcester; treasurer, Frank P. Simpson, Pittsfield; secretary, William H. Gilpatric, Boston.

Michigan

Kalamazoo Dental Society Meets: At the annual meeting of the Kalamazoo Dental Society, Dr. Donald E. Moe was elected president, and Dr. Merritt R. Roof, secretary-treasurer. Dr. Marcus L. Ward, of Ann Arbor, gave an illustrated lecture.

First District Dentists Meet: At the recent meeting of the First District Dental Society of Michigan, composed of 700 dentists from the counties of Oakland, Macomb, Monroe and Wayne, held in Ann Arbor on invitation of the Dental Society of the University of Michigan, the following officers were installed: president, Dr. Edwin H. Wicks; vice president, William F. Northrup; recording secretary, M. H. Miars; corresponding secretary, Warren P. Gibson; treasurer, M. R. Clinton; critic, George C. Bowles, Sr.

Minnesota

University of Minnesota Cancer Institute and Hospital: The cancer institute and hospital, made possible by the gift of $250,000 from Mrs. George Chase Christian, will be added to the present university hospital, and the staff will be composed of members of the clinical and laboratory staffs of the medical school. The hospital addition will have a capacity of fifty beds and the equipment includes surgical apparatus, roentgen ray and a radium emanation plant.

Mississippi

State Dental Society Officers: The following have been elected as officers of the Mississippi State Dental Society: G. F. Haynes, Laurel, president; R. S. Nyland, Jackson, vice president; A. A. Allen, Amory, secretary; C. K. Bailey, Grenada, treasurer; J. H. Brunson, Meridian, journalist. The next meeting will be held at Meridian.

Missouri

Advisory Executives of 7th International Congress: The following have been chosen as officers of the Missouri State Advisory Committee of the Seventh International Dental Congress: president, J. D. Patterson, Kansas City; first vice president, J. D. White, St. Louis; second vice president, H. F. D'Oench, St. Louis; secretary, H. C. Pollock, St. Louis; treasurer, J. P. Harper, St. Louis.

New Jersey

Radium Worker a Martyr to Science: Dr. Edwin E. Leman, who, for the last thirteen years has devoted himself to the study of radium rays, died, June 8, as a result of his devotion to the advancement of science. He was able to recover pure radium from its ore. During the last year, he had suffered periods of weakness, which culminated in collapse, several weeks ago.

Ohio

Cleveland Dental Society Officers: The newly elected officers of the Cleveland Dental Society are: president, Walter J. Pryor; president elect, C. T. Story; secretary, P. J. Aufderheide; treasurer, C. S. Adelstein.

Oklahoma

Oklahoma State Society Officers: At a recent meeting of the Oklahoma State Dental Society, the following officers were elected: president, Dr. W. T. Jacobs, Muskogee; president elect, Dr. T. W. Sorrels, Oklahoma City; secretary, Dr. Charles L. White, Oklahoma City; treasurer, Dr. C. A. D. Beer, Enid. The 1926 meeting will be held in Tulsa.

Pennsylvania

Dental Students at Army Service School: On June 12, seventy-nine dental students from the Evans Dental Institute of the University of Pennsylvania will answer the call to arms at the United States Army Field Service School, Carlisle, Pennsylvania. Six weeks will be spent in intensive training for a commission in the Dental Officers Reserve Corps of the United States Army. The University of Pennsylvania has had a R. O. T. C. Unit since 1920. Last year, ninety per cent of the students eligible for enrollment, entered the unit. Over four hundred men from fifteen different schools were in the camp last summer and the majority were from Pennsylvania. The elective course in Military Science and Tactics is given by an officer of the Dental Corps of the Army detailed by the Surgeon General. It is a progressive course of four years and includes thirty hours of instruction per year. . . . Enrollment for the R. O. T. C. Unit and the completion of the course in Military Science and Tactics coincident with the pursuit of the regular course in dentistry, will qualify a student to receive a commission in the Dental Officers' Reserve Corps of the United States Army upon the award of the degree of Doctor of Dental Surgery should he desire to accept the same. The course may be completed with but slight scholastic demands one hour a week and has definite educational, military and pecuniary advantages.—Alumni Register of the University of Pennsylvania, May, 1925.

Texas

Advisory Executives of 7th International Congress: The following have been chosen as officers of the Texas Advisory Committee of the Seventh International Dental Congress: W. H. Scherer, Houston, president; W. O. Talbot, Fort Worth, first vice president; W. D. McCarty, San Antonio, second vice president; B. F. Thielen, Paris, secretary-treasurer.

Vermont

Officers of State Dental Society: The following have been elected officers of the Vermont State Dental Society: H. B. Small, Burlington, president; Earle E. Johnson, Rutland, first vice president; R. D. Jenney, Bennington, second vice president; Lloyd C. Robinson, Morrisville, secretary; H. R. Bristol, Bennington, treasurer.

Foreign

Dental Surgeon Honored: Otho Decker, dental surgeon, was recently appointed as cabinet minister for Labor in the Duchy of Luxemburg. The Labor Department comprises also the Sanitary Service, Public Hygiene and State Thermal Establishment. Mr. Decker was elected a member of the Luxemburg Chamber of Deputies in 1918.

Work of Dental Services, Ontario: Dr. Fred J. Conboy, who has been appointed director of dental service for the Province of Ontario, announces the following as some of the activities planned under the new department: 1. The establishment of school dental services by municipalities. This will include a dental survey, classroom talks to the pupils, and a clinic where the children of the parents who cannot afford to pay ordinary dental fees can have the necessary work done. In this work the assistance of the teacher and school nurse can easily be secured. The dentists of the Province will make the initial survey gratuitously. 2. The organization and supervision of dental services in the various government institutions, especially those of the children. 3. The establishment of dental departments in connection with hospitals. The dentists of the Province have volunteered to give their services without fee for this work. Poor patients can have work done gratuitously or at small cost. 4. Arranging to have dentists locate in the smaller rural centres. The graduates are willing to start practice in these places, provided the municipalities will organize a school dental service, so that the dentist may have a small fixed income. Many municipalities are willing to do this in order that they may have a resident dentist. 5. The organization of the travelling

clinic in the outlying districts. With the assistance of the Public School Inspector, or someone who knows the district, the itinerary is planned and the various towns and villages are notified of the date when the travelling dentist will visit them. The patients pay a fee sufficient to cover the cost, and are glad to do so, as it saves them the expense of travelling to some place where there is a dentist. 6. In conjunction with the Director of Health Education, and the Oral Hygiene Committee of the Ontario Dental Association, to carry on an aggressive dental health education campaign, so that the general public may be warned in regard to the danger of dental diseases, and enlightened in regard to prevention and the maintenance of conditions of health and cleanliness in the oral cavity. Newspaper articles, public addresses, moving and still pictures, can be used for this purpose. 7. Cooperation with societies and associations seeking to protect the public from the ravages of dental diseases. 8. In conjunction with the Oral Hygiene Committee of the Ontario Dental Association to provide lectures for courses of instruction to teachers and nurses in training. 9. Assist in connection with many of the activities now carried on by the Department of Health, such as industrial health and the condition of contagion, and thus secure the more sympathetic and energetic cooperation of the profession of Dentistry in general health matters.—A. W. Ellis, in Oral Health.

General

New School of Medicine and Dentistry: The new School of Medicine and Dentistry of the University of Rochester will register students September 25, 1925. Plans have been made to enroll seventy-five in the future, fifty of whom will be medical students and twenty-five dental students, but the September class will be limited to twenty-five. Instruction in dentistry will cover a course of four years and dental students will be admitted on the same terms as medical students. The faculty is composed of the following members: Dr. George Hoyt Whipple, Dean and professor of pathology; Dr. George Washington Corner, professor of anatomy; Walter Ray Bloor, Ph.D., professor of biochemistry and Associate Dean; Dr. Stanhope Bayne-Jones, professor of bacteriology; Dr. William Sharp McCann, professor of medicine; Dr. Carl Miller Wilson, professor of obstetrics and gynecology; Dr. John J. Morton, Jr., professor of surgery; Dr. Samuel Wolcott Clausen, professor of pediatrics; Wallace Osgood Tenn, Ph.D., professor of physiology; and various other assistant professors and instructors.

The Gorgas Memorial: The Gorgas Memorial Institute seems to be accomplishing its initial purpose of uniting laymen and doctors and instilling into the masses a recognition of the fact that scientific medicine is the only proper authority in health matters. The Gorgas Memorial Institute evinces a healthy growth from the Atlantic to the Pacific. The value of periodic health examinations is a subject that the foundation is stressing in hundreds of newspaper articles, in public talks and in radio addresses, the country over. Scores of editorials have been written and published by leading newspapers. Without exception, they have deep sympathy with the ideals of the organization and heartily endorse it. County societies also are proving receptive to the Gorgas idea. They see in the movement a plan which will aid each member individually.—J. Indiana M.A., May, 1925.

Deaths

Craine, Louis E., (M.D.) Denver, Colo.: University of Michigan College of Dental Surgery, 1881; died, May 17; aged 70.

Curry, J. A., Streator, Ill.; Chicago College of Dental Surgery, 1889; died, April 27, after an operation for appendicitis.

Degel, Joseph T., Detroit, Mich.; Detroit College of Medicine (Department of Dental Surgery), 1899; died recently.

Funk, C. H., Cassopolis, Mich.; Indiana Dental College, 1883; died, May 19, after a brief illness.

Golbeck, Walter C., Chicago, Ill.; Chicago College of Dental Surgery, 1898; died, May 5.

Selleck, Arthur F., Chicago, Ill.; Chicago College of Dentistry, 1893; died June 6.

Smith J. C., Lowell, Mich.: University of Michigan College of Dental Surgery, 1907; died, May 10, after a long illness; aged 40.

CURRENT LITERATURE

EXTRACTS AND ABSTRACTS

Cereals and Rickets: In previous experimentation, Mrs. Mellanby demonstrated that cereals, especially oatmeal, seemed to have a rickets-producing property. (*Brit. Dent. J.*, May, 1925). White flour had the least action in this respect. When milk or butter was added to the diet, the condition improved, but rickets was not prevented. The addition of cod liver oil had the desired result, the daily intake of 10 c. c. completely antagonizing the effect of the oatmeal and leading to normal calcification. The later work of Professor Edward Mellanby carries these investigations a step farther, he having determined that the addition of various salts of calcium and phosphorus increased the deposition of calcium salts in the bone and to some extent antagonized the rickets-producing effect of cereals. In addition, he found that if the amount of oatmeal given is small, exposure to ultraviolet radiation had a favorable effect on bone formation, but it was impossible to overcome the effect of indigestion of large quantities of oatmeal. Exposure of the oatmeal to the ultraviolet ray lessens its rickets-producing powers but not sufficiently to prevent the development of rickets. Professor Mellanby has not determined the mode of action of cereals in producing this condition. He suggests that the races who thrive on a diet including large quantities of oatmeal do so because they consume also substantial amounts of milk, eggs and fish; as for example, the Scotch; or they have the benefit of much sunlight, as the people of tropical countries.

Treatment of Diseases of the Mouth by Radium: The Radium Institute has just issued a clinical index of radium therapy available free of charge to all medical practitioners, which gives a full account of the clinical use of radium. Although radium has its limitations, yet there are a surprisingly large number of conditions which are curable, or can be ameliorated by the application of this element. Among them are various conditions of the mouth which are of dental interest. Fordyce's disease is a curious condition affecting the mucosa of the lips, which may give rise to soreness and stiffness, accompanied by a sticky secretion. The mucous membrane contains groups of closely aggregated minute white or yellow milium bodies. A single exposure of about half an hour is usually sufficient to bring about a permanent cure. Leukoplakia of the cheeks and tongue can be treated with radium with success for a time, but we are informed that the condition tends to recur. The fibrous epulis of the jaws appears to be very amenable to radium treatment. An emanation tube of from 10 to 25 mg., according to the size of the tumor, embedded in the growth from eighteen to twenty-four hours, will usually induce its rapid disappearance. We imagine, however, that the majority of cases receive surgical treatment, which is eminently successful. The myeloid epulis is much less amenable to radium, and the results are far from constant or uniform. Some cases do well, while others are little affected. The same variation has been noticed in the case of myelomata of bones. Neither clinical nor microscopical examination sheds any light on this variation in reaction. Epitheliomata of the jaws are best treated surgically. If the condition is inoperable, radium may retard the growth, but this is the most that can be hoped for in the majority of cases.—*Brit. Dent. J.*, May 15, 1925.

Need of Vacations: The fact that two or three vacations are needed to carry the average person through the year at his highest efficiency is emphasized by Dr. W. A. Evans (*Chicago Commerce*, May 23, 1925), who quotes from Drs. Barker and

Sprunt (in "The Degenerative Diseases") as follows: "High blood pressure, with its attendant and resultant degenerative changes, is found not infrequently among people of nervous temperament who drive themselves at high speed, with insufficient rest, no vacations and no out-of-door recreations to relax the mental tension and to give the body the exercise that is necessary to health;" also from Dr. Victor C. Vaughn, who urges that we adopt the habit of easing up in February as well as in the summer. The need for vacations, which not only bring rest and recreation, but, more important, a break in the monotony of the daily routine and new points of view, is shown in increased efficiency of the individual and a decrease in sickness rates. Professor Huntington of Yale has determined by extensive study that the seasons of low efficiency are summer and winter, spring and autumn being the seasons of greatest output.

Care of Teeth in Pregnant Women: In no other condition is the direct relationship of systemic disturbances to the mouth more beautifully shown. In the beginning, the great problem is to prevent the absorption of calcium from the teeth. In order to treat this local dental condition, a superabundance of calcium and other minerals should be included in the diet. The next problem is to effect the assimilation of the calcium, so again in order to treat the local dental condition ultraviolet ray therapy must be instituted systematically together with vitamin A or D. The local dental condition is markedly influenced by so-called autointoxication. This must be treated systematically by including bulky foods with indigestible residue to stimulate peristalsis. Disuse atrophy, the greatest enemy of all, must be combated by including foodstuffs which must provide sufficient exercise to raise the local resistance of the tissue. The general condition known vaguely as acidosis has a marked local effect, which again is treated systemically by a highly alkaline diet. The physical and mental peculiarities of each individual must be taken into consideration as they may have a marked local effect. Last and least, speaking from the standpoint of physiology, not etiquette, dental prophylactic measures should be instituted expecting no greater results than local treatment would produce in any lesion of systemic involvement. Highly advertised dentifrices or beautiful pink, lavendar, red, magenta or other colored mouth washes have no more permanent effect upon the underlying causes of caries and pyorrhea than applications upon the local lesions produced by tuberculosis or syphilis. The problem of dental foci of infection is unsolved. Orthopedists have a whole lot more to learn about bone regeneration. Calcium metabolism offers rich rewards in research. Pyorrhea (so-called), in spite of all its cures, is still with us. These problems and countless others are not problems of medicine or dentistry alone but of science in general. The difference between medicine and dentistry should be no greater than the difference biologically between similar tissues elsewhere in the body.—Hugh W. MacMillan, in Dent. Summary, March, 1925.

Physiologic Effects of Radiation: In an experiment carried out at the University of Maine (W. T. Bovie, in *Boston M. & S. J.*, May 28, 1925), to test the physiologic effects of radiation, two hundred and fifty week old chicks were divided into three groups and kept in a greenhouse, one group being allowed to run in the sunlight and returned to the greenhouse at night and for feeding. A second group were exposed to the rays of a quartz mercury vapor lamp for twenty minutes each day. Those of the third group received only the sunlight which passed through the glass roof of the greenhouse. At the end of five weeks, the chickens in the first and second group had grown to twice the size of those in the third group.

Pyorrhea: David R. Rowe (*Australian J. Dentistry*, April 1, 1925) emphasizes the fact that pyorrhea is a condition of bone, not of the periodontal membrane. Up to the time the tooth is lost, the alveolus is continually building up and absorbing, changing its structure. As long as building is in excess of absorption, as in youth, pyorrhea never occurs. In adult life, an upset of the proper balance of building up and absorption means the beginning of pyorrhea. The alveoli are less resistant to disease than is true bone, and as they are not well supplied with blood, their nutrition depends largely on stimulation, which they receive during mastication. Any abnormal occlusal stress will upset the balance and

bone absorption will begin. When opposing teeth are missing, lack of function and stimulation will produce the same effect. The atrophy is not produced by inflammation but starts as a dissolution of the bone, inflammation developing later. He draws the following conclusions: (1) Pyorrhea begins as an atrophy, not as an osteitis. (2) True pyorrhea never starts as a gingivitis. (3) The beginning of the atrophy is at the alveolar margin, opposite occlusal stress where present. (4) Production of pus is a sequence of food in the trough, and tartar, which causes ulceration. (5) The presence of calculus is by no means a cause of pyorrhea. (6) We may have pus but no pyorrhea. He differentiates between horizontal and vertical pyorrhea. The following treatment is suggested: After a careful diagnosis, clinical and roentgen ray, with consultation with a physician when constitutional disease exists, the mouth is put in a sanitary condition and all sources of irritation are removed, the subgingival calculus being allowed to remain until the gum plastic operation is performed. Teeth that have outlived their usefulness are removed and occlusal stress relieved. Drugs are of little value and some that are advocated are even harmful. Hot, mild alkaline solutions and a good tooth paste may be used. Metallic salts seem the best of the drugs advocated, Dr. Prinz suggesting copper-sulphate, introduced into the pockets on a moistened toothpick, the pockets then being sealed with varnish or heavy petrolatum. Acidosis in the patient, which is common after 40, may be counteracted by sodium bicarbonate or citrocarbonate given in cold water daily. The gum-plastic operation of Drs. Widman and Neumann is advocated, consisting of surgical removal of the gum pocket, dead bone and granulation tissue, reforming the gum line to a new and healthy level.

Irradiation of Milk in Rickets: A test was made by Cowell of the efficacy of irradiating children's food as regards the promotion of bone calcification. Three young children with active rickets were given a diet, which was not in itself calculated to promote particularly rapid calcification in their bones. One pint of milk in the twenty-four hours was virtually the only source of antirachitic vitamin in the diet. The milk destined for two of the children was exposed to the rays of a mercury vapor lamp of the Hanot type before it was given to them, while the third child received untreated milk. The irradiation was carried out twice a day, the milk being exposed in a wide shallow dish for twenty minutes at a distance of 3 feet from the lamp. At the end of four weeks, roentgenograms of the children's wrists were again taken. In the case of the child that received untreated milk, there was, during the month, only a slight increase in the amount of calcification at the lower ends of the radium and ulna, while in the case of the two children that had received milk that had been exposed to ultraviolet rays, dense calcification had taken place, much in excess of what one would expect to have occurred in this short time as the result of giving this particular diet.—*Brit. M. J.*, abstr. *J.A.M.A.*, May 9, 1925.

Results of Urinalysis in University Entrants: At the University of California, a compulsory physical examination, which is carried out for the health service, and to determine whether the student can qualify for athletic activities, revealed that fifty-one of 1,224 men students had abnormalities of the urine. All the cases were followed up. Two of those examined proved to be nephritic, two had tuberculosis of the kidney and one had nephrolithiasis. Medical or surgical care was given as needed. The author (Robert T. Legge, in *J.A.M.A.*, April 4, 1925), stresses the fact that with the exception of one student none of those examined realized that they were suffering from any kidney or bladder lesion—an eloquent argument as to the value of routine urine examinations. "It is labor worth while, for the reward is so satisfactory, since chronic destructive pathologic changes are prevented, which ordinarily are determined only when constitutional symptoms are present, and when therapy offers little prospect of alleviation."

Irradiated Foods and Irradiated Organic Compounds: By exposing such foods materials as wheat, rolled oats, corn, hominy, cream of wheat, shredded wheat biscuits, corn flakes, patent wheat flour, cornstarch, meat, milk and egg yolk to ultraviolet, they can be endowed with rickets preventing properties. That such a wide variety of foods can be thus affected appears to be due to the fact that practically all naturally

occurring foods contain lipoidal constituents of the nature of sterols which can carry this activation. Cholesterol, for example, as obtained from brain is entirely inactive, but after exposure to ultraviolet light becomes rickets preventing. As fats are good solvents for these lipoids, practically all fresh fats, such as butter fat, olive oil, lard, corn oil, coconut oil and cottonseed oil, can be activated often to a degree to make them compare favorably with cod liver oil. As antirachitic action consists in the induction of calcium assimilation and its conservation for the animal, this is a matter which concerns not only the young but also the adult. It is suggested that these findings may have their significance not only in nutrition, but also in the therapy of those diseases known to respond to irradiation with ultraviolet light.—Harry Steenbock and Amy L. Daniels, in J.A.M.A, April 11, 1925.

Oral Sepsis and Ophthalmology: Two cases of uveitis are described by A. S. Tenner (Oral Topics, March, 1925), in which all treatment had failed until the true etiology of the condition was discovered. In one patient, a woman, aged 25, there was marked inflammation, with "numerous large gray mutton suet deposits" on Descement's membrane. A colleague diagnosed the condition as tuberculosis. But the same day the condition began to clear up, after extraction of four teeth. Eventually, there was complete restoration of vision. A second patient, a woman, aged 65, had been treated for three months by an ophthalmologist, who believed the source of the trouble was gastro-intestinal, and had referred her to an enterologist. The condition present resembled that found in Case 1, with, in addition, a large posterior synechia and dense opacities in the vitreous. All tests were negative. The oral cavity showed only four natural teeth (lower) remaining, a plate having been worn for years. A roentgenogram revealed four retained roots (upper), which were removed. Improvement was prompt and progressive, only the opacities of the vitreous remaining, probably as a result of the long delay in getting relief from the oral infection.

Green Teeth with Congenital Jaundice: Craig reports the case of a child born jaundiced. The skin of the whole body and limbs was colored yellow, and so were the sclerotics. The jaundice continued to be intense and quite constant for three months, then it became gradually less, but it had not entirely disappeared until the child was 7 months old. With the exception of the prolonged jaundice and a "slight bronchitis every time she cut a tooth," the child has had no illness of any kind. The first tooth a lower incisor, was cut at 9 months, and teeth appeared regularly after that. The first tooth "came in green," and all the others have done the same. The staining apparently is confined to the dentin, as the enamel at the cutting edges of the incisors seems to be free of stain. The staining approximates very closely to the amount of dentin that has been formed at the period just after birth.—Brit. M. J, abstr. J.A.M.A., April 18, 1925.

Quality of Nitrous Oxid Manufactured in the United States: G. W. Hoover, Washington, D. C. (J.A.M.A., May 16, 1925), reports on the investigation of nitrous oxid made by the bureau of chemistry. The survey of this industry included an examination of raw materials, the collection and examination of representative samples of the gas as found on the market in different sections of the United States, and interviews with surgeons, dentists and anesthetists. The findings, though gratifying in the main, show the need for a close and continued watch over the quality of nitrous oxid being marketed. The production of this important anesthetic in the United States is in the hands of comparatively few manufacturers. It is a highly specialized industry, and there is every reason to believe that safe nitrous oxid is being marketed. This conclusion was borne out by the present investigation of representative samples. It is particularly gratifying to the bureau that none of the samples examined contained enough impurities to warrant action under the Food and Drugs Act. While a few samples showed the presence of perceptible traces of nitric oxid, none contained harmful quantities.

THE DEFENSIVE DIET LEAGUE OF AMERICA*

A FOOD FAD ORGANIZATION THAT IS MAKING A SPECIAL APPEAL TO THE DENTAL PROFESSION

DURING the last eighteen months, letters of inquiry have come in from physicians, dentists, public health officials and laymen asking for information regarding the Defensive Diet League of America. A physician who was commissioner of health for a large midwestern city wrote:

"At a meeting of the ———— County Dental Society last night to which I was invited, I had to listen to Mr. George E. Harter, who was introduced as the president of the Defensive Diet League of America. Mr. Harter hails from Toledo and by his own admission has devoted twenty-five years of his life to the subject of diet and health. What information have you concerning Mr. Harter and the Defensive Diet League of America?"

A state supervisor of nutrition wrote:

"I recently received literature put out by the Defensive Diet League of America, Toledo, Ohio. Their claims are so preposterous that I am wondering if you could give me any definite information as to what the League is and the type of man who is in charge of it."

The instructor in home economics in the state university of one of the northwestern states wrote:

"What can you tell me concerning Mr. G. E. Harter, head of the Defensive Diet League of America? Has he had education of the character that would justify him in giving advice along dietary lines? I notice that he quotes Tilden of Denver quite as frequently as he does McCollum and others of recognized scientific background."

A North Carolina physician wrote:

"Please send me information relative to the Defensive Diet League of America and the literature they publish. It seems that their clientele consists mainly of dentists who are putting patients on all sorts of fool diets."

The Defensive Diet League of America seems to be the brain-child of one G. E. Harter of Toledo. According to Harter's own admission in the Defensive Diet League literature, he is part owner of the Ransom and Randolph Co. of Toledo, a concern that manufactures and deals in dental supplies. Furthermore, Harter says: "I earn my bread and butter by managing the *Dental Summary*." The *Dental Summary*, a commercially owned publication, published by the Ransom and Randolph Co., in type and character is reminiscent of some of the commercially owned medical journals that flourished twenty years ago and did so much to dominate therapeutics and debauch scientific medicine.

Under the circumstances it was perhaps natural that Mr. Harter, in attempting to float his Defensive Diet League, should attempt to enlist the attention of the dentists of the country in his scheme. And he seems to have been fairly successful, appearing before dental societies and in other ways making use of such organizations as the dentists have. Part of Harter's plan seems to be that of making dietetic experts of the dentists. He appeals to that profession in these words:

"I know what it is going to mean to every man who takes it up earnestly. He is going to get more patients, he is going to get better fees for fifteen to twenty minutes' advice as a

*From the Propaganda for Reform department of *The Journal of the American Medical Association*, June 20, 1925.

dietetic expert than he ever got for an hour's labor at the chair. . . . I am very sure that back of all this thing in my mind there is the ruling desire that more dentists be enabled to acquire a competence during their comparatively few productive years. I hope enough has been said to emphasize the earning possibilities of this new phase of dental service."

At the first annual meeting of the League, which was held in September, 1923, and at which the statement just quoted was made by Mr. Harter, this gentleman also admitted that up until that time the League had been a "one-man affair," and that he, Harter, had done and directed everything that had been done. At the time, he told the assembled dentists that if he was to remain in the work he would not be willing to turn the League over to any man or group of men that he would have to "consult and please." He suggested, however, that a dentist be selected from each state in the Union who would be the state chairman of the Defensive Diet League. A reading of the proceedings of this first meeting gives the impression that Mr. Harter had the convention, as it were, in his pocket. At any rate, the assembled dentists authorized Mr. Harter to pick his own state chairman, who, in turn, if they felt like it, could elect a general chairman.

THE MEDICAL ADVISORY BOARD

In addition to the various dental state chairmen there has also been created a Medical Advisory Board. Whether these men were also picked by Mr. Harter does not appear, but the medical profession will be interested in knowing who comprises the Medical Advisory Board of the Defensive Diet League of America. Here they are:

CHARLES SANFORD PORTER, Palms, Calif.—According to our records, Dr. Porter was born in 1862 and was graduated by the New York University Medical College in 1893. Dr. Porter has lived in California since 1896, the time he was licensed to practice in that state. For some years Dr. Porter operated the Porter Sanitarium at Burnett, Calif., which was said to be the "Home of the Original Milk and Rest Cure." In 1924 he opened the Porter Milk Diet Sanitarium at Palms, Calif.

WILLIAM HOWARD HAY, M.D., Buffalo, N. Y.—According to our records, Dr. Hay was born in 1866, and was graduated by the New York University Medical College in 1891. He seems to have practiced in Youngsville, and Corry, Pa., going to Buffalo, apparently, early in 1921. A newspaper clipping from a Corry, Pa., paper of August, 1918, reports that the "Hay rest cure" operated by Dr. W. H. Hay had introduced "a special service department for the cure of hay fever cases." In 1916 a physician had written stating that Dr. Hay who was operating the Hay Rest Cure Sanitarium at Youngsville, Pa., had a "diabetic cure." The American Medical Liberty League, an organization that is opposed to scientific medicine, publishes two diatribes credited to William Howard Hay and distributes them at 30 cents and 50 cents a hundred, respectively. Dr. Hay seems to be writing somewhat extensively for the Defensive Diet League bulletins, telling of his success in the treatment of various conditions by his own peculiar methods. In his letter of acceptance to the physician on the advisory board, Dr. Hay states that he is "entirely out of sympathy with classic therapeutics."

OSCAR JONES, M.D., Indianapolis, Ind.—According to our records, Dr. Jones was graduated in 1901 by the

Central College of Physicians and Surgeons, Indianapolis. For many years he has been in the "cancer cure" business and has advertised "Cancer, My Cure is Guaranteed." While running his "medical non-surgical treatment of cancer" he also seems to have been connected with the "Medilation Co."—a medical, nonsurgical treatment of piles, claiming to cure nine out of every ten patients that he accepted. Dr. Jones' name appeared as an officer in the "Allied Medical Associations of America." Dr. Jones was, if he is not still, a disciple of the "Electronic Reactions of Abrams," and, according to Abrams' own booklets, was a lessee of at least one "Oscilloclast."

ARNOLD JACKSON, M.D., Madison, Wis.—According to our records, Dr. Jackson was born in Madison, Wis., in 1893, and was graduated by the Columbia University College of Physicians and Surgeons in 1919. He entered the Mayo Foundation in 1919, leaving in July, 1922. He is at present practicing surgery in Madison. As Dr. Jackson gets older he will doubtless look back on his connection with the Medical Advisory Board of the Defensive Diet League of America with chagrin.

DALTON RICHARDSON, M.D., Austin, Texas.—According to our records, Dr. Delmer Dalton Richardson was born in 1868, and was graduated in 1894 by the Medical College of Ohio, Cincinnati. For many years Dr. Richardson was in Chicago. He received his Texas license in 1920.

ACTIVE AND ASSOCIATE MEMBERSHIP

So much for the Medical Advisory Board. As to the Defensive Diet League's organization, its Active Membership is open only to "dentists, physicians, hygienists and dietitians." The annual dues are $10 a year. In addition, the concern has what it calls an Associate Membership that is open to the public, price $5 a year. Active members receive a four page monthly bulletin, evidently prepared by Harter, and consisting mainly of quotations from various sources, good, bad and indifferent, together with such original articles as medical adviser William Howard Hay may furnish. The active members also get occasional supplementary printed matter, advertising certain side lines that the Defensive Diet League seems to be sponsoring. These include such products as "Dietetic Baking Powder," said to be made of cream of tartar, bicarbonate of soda and corn starch (no quantities given) and sold at $1 a pound; a household food chart, price $2; steam pressure cooking utensil, and a fruit and vegetable press.

The associate members get for their $5 a loose leaf binder and twelve small bulletins. In addition, they get four "personal advisory coupons" which, when mailed to the Defensive Diet League (accompanied by $2), will pay for "one letter of advice on dietary subjects."

SOME OF THE LEAGUE'S "AUTHORITIES"

The bulletins recommend and offer for sale certain books as authorities; they also give the names and addresses of concerns that supply certain food products that are approved by the League. The books recommended are a hodge-podge of works of men who are authorities on nutrition and those that are put out by food faddists and hobby-riders. One finds recommended, for example, McCollum's "Newer

Knowledge of Nutrition" sandwiched in between a book by the erratic McCann and Chiropractor Froude's "Right Food the Right Remedy." There is a book by Charles Sanford Porter on "Milk Diet"; one by Kellogg, "The Itinerary of a Breakfast"; a third on "The Care of Children," by J. H. Tilden, with a fourth on "Rational Diet," by Otto Carque. Readers of *The Journal* will remember that Tilden is the individual out in Colorado who for some years conducted a so-called health school and ran as an advertising medium a small magazine first called the *Stuffed Club* and later the *Philosophy of Health.* Mr. Harter of the Defensive Diet League thinks Tilden is about the last word in the science of nutrition. In fact, he calls Tilden "the head of the dietetic profession in America, probably of the world." Tilden holds that every disease is due to toxemia; that toxemia is due to enervation, and that enervation is due to improper eating. By eating according to Dr. Tilden's suggestions one may be cured of anything from cancer to smallpox, or from soft corns to freckles. Tuberculosis, according to Tilden, is "not a germ disease," and, says he, "I have proved often enough that smallpox is not contagious." Rabies, according to this same authority, is not a reality; it's all in your mind. In fact, Dr. Tilden insists that "the germ theory" is "merely a plausible fallacy." Before leaving Dr. Tilden's case, it may be said that Mr. Harter, who seems to answer various therapeutic questions, received a telegram from a dentist asking whether his (Harter's) goiter treatment would apply to the exophthalmic type. Harter rather doubted if it would, and recommended the dentist to consult Tilden.

Another authority quoted by Harter with evident approval is "Dr." Harry Ellington Brooks, who, before he died some months ago, used to run a weekly department in the magazine section of the Los Angeles *Times.* Brooks was a crude quack who played the so-called drugless game, but on the side, under another name, exploited a drug product on the mail-order plan that was declared a fraud by the government and debarred from the use of the mails. Incidentally, it is of interest to note that the product itself was compounded for Brooks by Otto Carque, who was in partnership with Brooks in its exploitation. Carque appears to be the same individual whose book and whose food products are both boosted by Mr. Harter.

One other authority quoted by Mr. Harter is Dr. C. S. Carr. Carr, of course, has been dead some years. While alive, Carr was a mail-order quack, ran a fake health journal and acted as the advertising expert for the Peruna concern. Before leaving this phase of the subject, it should be said that Harter also recommends as a coffee substitute "Grains of Health," which he describes as a "healthified coffee." "Grains of Health" is said to be a mixture of coffee, roots and vegetables, and is said not to produce the harmful effects of coffee. Analysis is said to have disclosed the fact that this preparation contains nearly 40 per cent coffee, and obviously, therefore, has the virtues and vices of coffee admixed with about 60 per cent of roots and vegetables.

HARTER'S DIETETIC ERUDITION

So much for the scientific background disclosed by Harter through his bulletins. In closing, a few words should be said of Harter's own knowledge and dietetic erudition as exhibited by his writings in the League bulletins. First of all, Mr. Harter apparently holds the bizarre notions regarding health and disease that are held by Tilden. Here is what Harter calls his "fundamental principle":

> "All so-called 'diseases' are but so many more or less localized manifestations or symptoms—vents, safety valves, perhaps, warnings at least—of one underlying condition, toxemia, the result of acidosis, brought about by habitual and long-continued eating of the wrong foods at the wrong times or in wrong combinations."

This means that according to Harter conceptions the child that is suffering from diphtheria has merely been eating wrongly; the individual who has acquired a chancre is paying the penalty of dietetic error; a person with malaria has simply eaten the wrong food—but why go further? Here is an individual who in this year of grace attempts to enlist the confidence and help of the dental and medical professions in a campaign for dietary reform, and who is so ignorant of the most elementary facts of modern medical science that he charges all disease as being due to wrong methods of eating.

Some other peculiar views of Harter are that table salt "has no place in an enlightened diet, never did have, never can have, serves no useful purpose and is wholly destructive." Worse than this, according to Harter salt will cause impotence about the fiftieth year (Bulletin No. 3). To uphold his peculiar views on salt, Harter copies H. L. Harris' widely distributed article, "The Value of a Salt Free Diet." H. L. Harris, our readers may remember, is not so much interested in deploring the use of salt as he is in boosting the use of borax and its compounds. In short, Mr. Harris has long been the press agent for the "Borax Trust," and has for year succeeded in getting letters and articles accepted by unthinking magazines and newspapers in behalf of the borax people's propaganda for the use of that chemical as a food preservative.

Harter also reports the cure of malaria brought about by eating sauerkraut (Bulletin No. 4). He states further that persons eating three meals a day should have three bowel movements daily, in which contention, of course, he follows the Battle Creek idea.

One of Harter's pet theories is that when one eats he should not combine two kinds of starchy foods. As he puts it, "combinations of starches are bad" and "combinations of starches and proteins are as bad or worse" (Bulletin No. 6). Furthermore, starches, according to Harter, should never be eaten with foods that are digested by the gastric juice (Bulletin No. 7). Further, "none of the fruits can be eaten with starches safely" (Bulletin No. 8). Summed up, he tells us: "Don't eat more than one kind of starchy food at any meal," and "don't eat more than one kind of protein (meat, eggs, fish, etc.) at any meal (Bulletin No. 14). And whatever you do, "don't eat cereal foods at the morning meal" (Bulletin No. 15). In Bulletin No. 17 Mr. Harter states that he has successfully treated three cases of goiter with the expressed juice of chopped cucumbers, carrots and

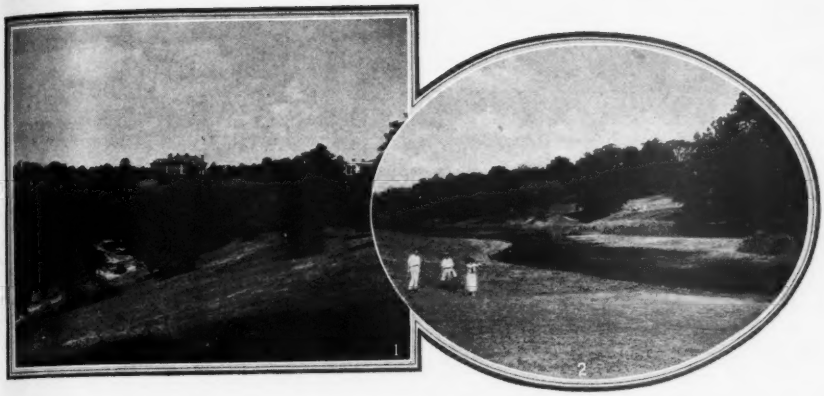
onions as the sole food given on alternate days.

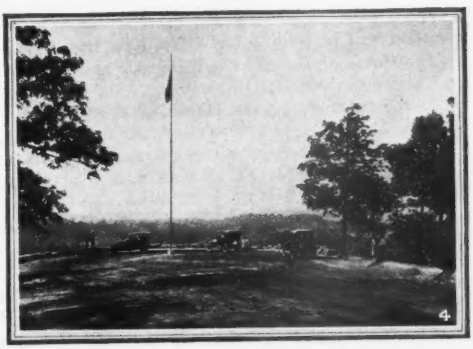
When Mr. Harter was addressing the assembled members of the League at the first annual meeting, he made a statement that will prove of interest to the medical profession, or at least to those members of the medical profession who think that they have some slight knowledge of human pathology. Said Mr. Harter: "We happen to know that if a man has any kind of a catarrh, a mucous discharge anywhere in the body, he is over-eating on proteins." During this meeting Mr. Harter so comported himself that one might be led to assume that the sun of dietetic knowledge rose and set in G. E. Harter. In explaining his altruistic campaign with the obvious idea of giving a reason for his enthusiasm, Mr. Harter said:

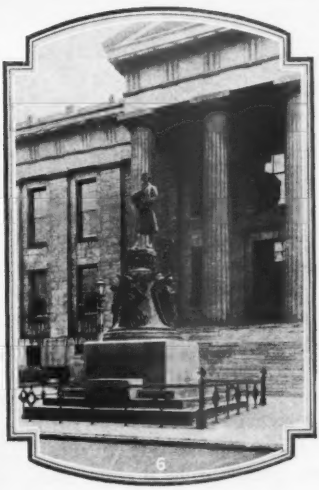
> "Last year and every year a half-million people died and are dying for lack of the knowledge I can give them. . . . And another half-million little helpless children, between the ages of six and ten, are dying every year because I have not told their parents the things that I know about the food they eat."

So much for Mr. Harter and the Defensive Diet League. "The physician does not desire to practice dietetics. He already has more than he can do," says Mr. Harter, which may explain why he tackles the dental profession. Nothing in the foregoing article should be interpreted as intimating that *The Journal* believes that Mr. Harter is dishonest or that the Defensive League is fraudulent. On the contrary, there is reason to believe that Harter is entirely sincere. It is true that his interest in the League may not be due wholly to his belief that he is the Moses that is to lead the lost tribes of dentistry out of the desert of dietetic ignorance, but may in part, at least, be activated by his connection with a dental supply house and the publication of the *Dental Summary*—the latter of which, by the way, publishes material that appears in the League's bulletins, using, apparently, the same type.

The point of this article is that if the public and the dental and medical professions need instruction on dietetic matters, they should get that instruction from individuals and organizations that have at least a scientific background, and whose elementary knowledge of the science of nutrition is at least equal to that of an ordinary high school pupil. The Defensive Diet League seems to have no such background, and Mr. Harter apparently has no such knowledge.







Louisville: 1. Road to Big Rock in Cherokee Park. 2. Cherokee Park Municipal Golf Links. 3. Monument of General Zachary Taylor. 4. Observation Point, Iroquois Park. 5. Scene on Ohio River. 6. Statue of Thomas Jefferson, in front of the court house.

AMERICAN DENTAL ASSOCIATION SIXTY-SEVENTH ANNUAL SESSION

LOUISVILLE, KENTUCKY, SEPTEMBER, 21, 22, 23, 24, 25, 1925

OFFICIAL CALL

To the Officers, Members and Constituent Societies of the American Dental Association:

You are hereby notified that the Sixty-Seventh Annual Session of the American Dental Association will be held at Louisville, Ky., Sept. 21-25, 1925.

The House of Delegates will convene at 10:00 o'clock in the forenoon and 2:30 o'clock in the afternoon, Monday, September 21, in the Lounge Room, Kosair Temple. The third and fourth meetings of the House of Delegates will be held Wednesday and Thursday, September 23 and 24, at 2:30 o'clock, in the Ball Room, Brown Hotel.

The general meeting, which constitutes the opening exercises of the Session, will be held Tuesday, September 22, at 9:40 a. m., in the Ball Room, Brown Hotel, and general meetings will be held at 8:00 p. m. on that and subsequent days of the Session.

The various sections of the American Dental Association will meet Tuesday, September 22, at 2:00 p. m., and thereafter, according to their respective programs.

The Registration Department will be open from 8:30 a. m. until 5:00 p. m., Monday, Tuesday, Wednesday and Thursday, September 21, 22, 23 and 24, and from 8:30 to 10:00 a. m., Friday, September 25, in the Main Lobby, East Entrance, Kosair Temple.

The constituent societies are hereby notified to file with the General Secretary of this Association, at least thirty (30) days prior to the first day of said Annual Session, a list of the names and addresses of their delegates and alternates.

C. N. JOHNSON, *President.*
OTTO U. KING, *General Secretary.*

SPECIAL ANNOUNCEMENTS

Registration ..... Monday, September 21, 8:30 a. m.
(Main Lobby, East Entrance, Kosair Temple.)

Meetings of Board of Trustees, Saturday..... September 19, 10:30 a. m. and 2:30 p. m.
(Trustees' Headquarters, Room 432, Brown Hotel. All subsequent meetings will be held in the same place.)

First meeting of the House of Delegates..... Monday, September 21, 10:00 a. m.
(Lounge Room, Kosair Temple.)

Second meeting of the House of Delegates..... Monday, September 21, 2:30 p. m.
(Lounge Room, Kosair Temple.)

Third meeting of the House of Delegates..... Wednesday, September 23, 2:30 p. m.
(Ball Room, Brown Hotel.)

Fourth meeting of the House of Delegates..... Thursday, September 24, 2:30 p. m.
(Ball Room, Brown Hotel.)

Fourth Annual Dental Health Exhibit.....Monday, September 21, 10:00 a. m.
(Exhibit Hall, Kosair Temple, East and West Entrances.)

This exhibit, which is under the auspices of the Council on Mouth Hygiene and Public Instruction, and the Local Arrangements Committee, will be open to the profession, exhibitors, visitors and invited guests during the entire meeting.

Manufacturers' and Dealers' Exhibits.....Monday, September 21, 10:00 a. m.
(Exhibit Hall, Kosair Temple.)

The commercial exhibits will be open during the entire meeting.

PRELIMINARY PROGRAM FOR LOUISVILLE SESSION

FIRST GENERAL MEETING

(Ball Room, Brown Hotel. All subsequent general meetings will be held in the same place)

TUESDAY, SEPTEMBER 22, 9:40 A. M.

Music.....9:40-10:00
In Charge of Theodore Buest, Louisville, Ky.

Invocation
By Bishop Charles E. Woodcock of the Episcopal Church, Louisville, Ky.

Vocal Solo
By Miss Esther Metz.....Louisville, Ky.

Address of Welcome on Behalf of the State of Kentucky
By Governor William J. Fields

Address of Welcome on Behalf of the City of Louisville
By Mayor Huston Quin

Address of Welcome on Behalf of the University of Louisville
By A. Y. Ford, President

Address of Welcome on Behalf of the Kentucky State Dental Association
By the President (elected at annual meeting, September 19, 1925)

Presentation of Gavel to C. N. Johnson, President of the American Dental Association, on Behalf of the Local Arrangements Committee
By E. C. Hume

Response to Address of Welcome
By Don M. Gallie, Sr.....Chicago, Ill.

Introduction of Distinguished Visitors

President's Address
By C. N. Johnson.....Chicago, Ill.

Adjournment

Exit March

FOURTH GENERAL MEETING

(Ball Room, Brown Hotel)

Thursday, September 24, 8 p. m.

Music

"Saving Millions and Preserving Life Through Oral Hygiene"
By Willis A. Sutton, Superintendent Public Schools.....Atlanta, Ga.

THE SCIENTIFIC SECTIONS*

OPERATIVE DENTISTRY, MATERIA MEDICA AND THERAPEUTICS

(Lounge Room, Kosair Temple. All subsequent meetings will be held in the same place.)

OFFICERS OF SECTION

Alfred P. Lee, Chairman.....Philadelphia, Pa.
M. M. Printz, Vice Chairman.....Chicago, Ill.
George W. Hillias, Secretary.....Kansas City, Mo.

TUESDAY, SEPTEMBER 22

2 to 5 p. m.

"The Porcelain Jacket Crown—Its Usefulness for Removable Bridgework"
By Carlisle C. Bastian.....New York City

Synopsis—A consideration of the shoulder and overlap all-porcelain jacket crowns. A compromise gold and porcelain jacket particularly suitable for posterior teeth. The use of jackets for Bonwill bridges. The technic for making a removable bridge, using porcelain jacket crowns with metal shoulder and inlay attachments.

Discussed by
C. E. Burgson.....Kansas City, Mo.
George A. Thompson.....Chicago, Ill.

"The Possibilities of Prevention in Dentistry"
By Arthur D. Black.....Chicago, Ill.

Discussed by
G. A. Crise.....Manhattan, Kan.
R. E. Denney.....Philadelphia, Pa.

"Diet Our Best Therapeutic Ally"
By Jesse V. Boswell.....Springfield, Mo.

Synopsis—Practical feeding for aid in prevention and cure of oral disorders, with little journeys into the by-roads of evolution, heredity, endocrinology, biology, etc. Vestigial teeth of man. Hereditary tendencies. Mechanism of metabolism. Newer knowledge of nutrition: a study of substances necessary for growth and maintenance. Amino-acids. Vitamins. With pictorial illustrations, chemical demonstrations and clinical observations.

Discussed by
Henry F. Hoffman.....Denver, Colo.
Morton J. Loeb.....New Haven, Conn.

WEDNESDAY, SEPTEMBER 23

9 a. m. to 12 m.

"Gold Foil—Its Application to Proximal Cavities of the Upper Anterior Teeth"
By Frank D. Burns.....Denver, Colo.

Synopsis—Foil as the material par excellence for proximal cavities in anterior teeth. Cavity preparation for placing foil from the lingual surface, thus avoiding a great display of gold without long and painful separation. Exploding the idea that malleting foil is hard on both operator and patient. Adapting foil and finishing the filling.

Discussed by
William Finn.....Pittsburgh, Pa.
R. J. Rinehart.....Kansas City, Mo.

"The Three Fundamental Reasons for Failure of Fillings"
By R. R. Byrnes.....Atlanta, Ga.

Discussed by
R. C. Seibert.....St. Louis, Mo.
Erling Thoen.....Iowa City, Iowa.

"Why Fill Root Canals?"
By W. A. Chamberlain.....St. Louis, Mo.

Synopsis—There is a tendency among some conscientious operators who have been especially interested in canal operations because of roentgenographic and clinical observation, together with the trend to underfill rather than overfill, to question the efficiency or need of a canal filling. In approaching this phase of the subject, necessarily a bit of history; the object of a canal filling; difficulties involved; reasons for reinfection and protrusion and underfilling will be considered.

Discussed by
J. R. Blayney.....Chicago, Ill.
Milton J. Waas.....Camden, N. J.

*Length of Papers and Discussions.—The time allowed for the presentation of a paper before a section shall be limited to thirty minutes, except by unanimous consent. No one shall address a section more than once on the same subject, nor for longer than five minutes, except with the consent of the majority of those present.—By-Laws, Chapter XIV, Section 2.

2 to 5 p. m.

"Amalgam—Its Working Peculiarities and Operating Demands"

By William E. Harper.....Chicago, Ill.

Synopsis—The extent and character of our failures with amalgam. A proper understanding of the following new details of amalgam procedure must be acquired, and practically applied, to make uniformly perfect nonleaking amalgam fillings: adaptable plasticity, tamping, orderly packing, stepping the cavity walls. Description of these procedures, with explanation of their need.

Discussed by

Hugh M. McElrath.....Murray, Ky.
John V. Conzett .....Dubuque, Iowa

"Focal Infections from the Point of View of the Internist"

By William A. Jenkins (M.D.)
.....Louisville, Ky.

Synopsis—1. The relationship of focal infections to general or systemic diseases. 2. Common portals of entry for focal infections. 3. Discussion of specificity, or the ability of certain organisms to select and lodge in certain definite internal organs, e.g., the gallbladder; the pelvis of the kidney and the gastro-intestinal tract. 4. The relationship of focal infections of the oral cavity to systemic diseases.

Discussed by

Boyd S. Gardner.....Rochester, Minn.
Gaylord C. Hall (M.D.) Louisville, Ky.

Kosair Temple

"A Consideration of the Pharmacologic Action of Certain Dental Remedies"

By W. H. O. McGehee..Cleveland, Ohio

Synopsis—A brief résumé of the work that has been accomplished by various investigators in this field, to the present time, together with a discussion of the needs, under various oral conditions, for the application of dentifrices of varying types. Is there an ideal dentifrice for all conditions and is the type of dentifrice more important than the type of brush?

Discussed by

J. S. Ashbrook.....Pittsburgh, Pa.
Malvern D. Huff.....Atlanta, Ga.

THURSDAY, SEPTEMBER 24

9 a. m. to 12 m.

"Porcelain Restorations of Vital and Pulpless Teeth"

By J. J. Moffitt .....Harrisburg, Pa.

Synopsis—Porcelain restorations of vital and pulpless teeth. Porcelain inlays, direct and indirect method. Restoring corners, etc., on vital and devitalized teeth. Cervical fillings. Retention and the handling of the cement. Porcelain blocks for light and hygienic bridgework. Baking to articulation.

Discussed by

Edgar H. Keys .....St. Louis, Mo.
Will P. Smedley .....Denver, Colo.

"Orthodontics and General Dentistry"

By H. G. Tanzey.....Kansas City, Mo.

Synopsis—Observations covering a period of a quarter of a century, the first ten years of which were devoted to general practice of dentistry, followed by fifteen years limited to orthodontics, taught in both a regular dental college and a postgraduate school of orthodontia.

Discussed by

James H. Ferguson, Jr.....Baltimore, Md.
Harris W. McClain.....Chicago, Ill.

"Roentgenography and Diagnosis"

By George R. Warner.....Denver, Colo.

Synopsis—A plan of examination and diagnosis, with slides showing examination chart, models and cases, before, during and after treatment. 1. Careful diagnosis as compared with the cut and dried methods that have been used too generally in the past. 2. Diagnosis based on a thorough

Louisville College of Dentistry

examination, with a reasonably simple method of making and recording such an examination. 3. Graph of a fairly complete examination, with an explanation of the details of making the clinical examination. 4. Obtaining of all possible laboratory data, which should include a complete roentgen-ray examination. 5. Some details in examining roentgenograms, with special stress on their value as an aid in keeping teeth vital.

Discussed by

James A. Blue ..... Birmingham, Ala.
H. M. McFarland ..... Kansas City, Kan.

A Message from the Chairman of the Section

The Section on Full Denture Prosthesis will present a program in the form of a symposium. The subjects are of vital importance and those that at the present time are giving the practitioner the most trouble. It is with the thought of assisting the practitioner in a solution of these problems that the program has been arranged. The committee extends a cordial invitation to all members of the profession to participate in its sessions and to enter into the discussions.

A. ALFRED NELSON, *Chairman.*

Y. M. C. A.

FULL DENTURE PROSTHESIS

(Auditorium, Second Floor, University of Louisville College of Dentistry. All subsequent meetings will be held in the same place.)

OFFICERS OF SECTION

A. Alfred Nelson, Chairman ..... Detroit, Mich.
F. M. Hight, Vice-Chairman ..... Houston, Texas
W. T. Jacobs, Secretary ..... Muskogee, Okla.

TUESDAY, SEPTEMBER 22

2 to 5 p. m.

The program as arranged is in the form of a symposium on denture construction, of which the following papers, in sequence, deal with a particular phase of the subject.

"The Problems of Denture Construction, Including the Conduct of Practice. (*a*) Method of Dealing with Patients.

(*b*) Cost of Denture Service. (*c*) Diagnosis. (*d*) Records Taken, Etc.

By H. J. Horner.....Pittsburgh, Pa.

Discussed by

J. R. Caughron....Oklahoma City, Okla.
C. C. Sparrow.....Minneapolis, Minn.

"Mouth Examination and Tissue Resiliency"

By William M. Randall..Louisville, Ky.

Discussed by

E. J. Farmer.....Buffalo, N. Y.
J. W. Crawford.....Milwaukee, Wis.

"Roentgenographic Evidence of Tissue and Bony Support"

By Howard H. Jackson....Detroit, Mich.

Synopsis—The necessity of a thorough knowledge of the condition of the supporting structures and the influence that they will have on a satisfactory artificial denture, including the presence or absence of cortical bone and the question as to the influence of infiltration of the crests of the septums in periodontoclastic conditions.

Discussed by

George R. Warner.....Denver, Colo.
Hugh W. McMillan....Cincinnati, Ohio

WEDNESDAY, SEPTEMBER 23

9 a. m. to 12 m.

"Diet for Edentulous Patients"

By Victor H. Sears.....Salt Lake City, Utah

Discussed by

Virgil E. Simpson (M.D.).....Louisville, Ky.
Lindley H. Stout (M.D.).....Detroit, Mich.

"Impressions: The Extension of the Periphery or What is Known as Physiologic Extension, Which Covers Both Plaster and Compound Technics"

By Francis S. Weir.....New York City

Discussed by

W. T. Jacobs.....Muskogee, Okla.
I. Lester Furnas.....Cleveland, Ohio

"Interpretation and Registration of Mandibulomaxillary Relations and Their Reproduction in an Instrument. (*a*) Subsequent Changes. (*b*) Effects of Opening. (*c*) Movements Involved.

By Russell W. Tench....New York City

Discussed by

F. M. Hight.....Houston, Texas
George P. Phillips.....Boston, Mass.

2 to 5 p. m.

"Occlusion: The Relationship Between Incisal Guidance or Overbite and Overjet to the Curve of Spee and the Condylar Guidance"

By A. E. Boyce.....Tuscola, Ill.

Discussed by

W. H. Wright.....Pittsburgh, Pa.
Marcelino Weiss.....Havana, Cuba

"Correct Preliminary Preparation of Materials and Cases for the Laboratory and Proper Instruction Accompanying Each Case"

By George Roth.....Hartford, Conn.

Discussed by

W. A. Clements.....Memphis, Tenn.
H. F. McGrane.....Sioux City, Iowa

"Color and Esthetic Arrangement. (*a*) Hue. (*b*) Form. (*c*) Size. (*d*) Arrangement of the Porcelain Teeth for Use in Prosthetic Restorations"

By E. B. Owen.....St. Louis, Mo.

Discussed by

A. K. Parks.....Montgomery, Ala.
E. H. Bruening.....Omaha, Nebr.

THURSDAY, SEPTEMBER 24

9 a. m. to 12 m.

"Staining, Etching, Grinding and Baking of Individual Teeth for Esthetic Purposes"

By Milton Cohen.....New York City

Discussed by

Albert Leland LeGro....Detroit, Mich.
James Allan Graham.....San Francisco, Calif.

"Correction Technic. (*a*) Centric Occlusion (*b*) Centric Relation (*c*) Intermediate Occlusion (*d*) Balanced Occlusion"

By Rudolph L. Hanau....Buffalo, N. Y.

Discussed by

R. O. Schlosser.....Chicago, Ill.
C. J. R. Engstrom....Los Angeles, Calif.

"Résumé of the Entire Problem of Denture Construction, Including Education and Training of Patient"

By I. V. Duell.....Louisville, Ky.

Discussed by

Robert R. Gillis.....Hammond, Ind.

Harry D. Weller.....Indianapolis, Ind.

PARTIAL DENTURE PROSTHESIS

(Lecture Hall, Third Floor, University of Louisville College of Dentistry. All subsequent meetings will be held in the same place.)

OFFICERS OF SECTION

O. DeForest Davis, Chairman.....Minneapolis, Minn.

H. E. King, Vice Chairman.....Omaha, Nebr.

B. B. McCollum, Secretary.....Los Angeles, Calif.

A Message from the Chairman of the Section

Virtually three-fourths of the general dental practitioner's daily problems result from the loss of teeth. There is no branch of dentistry in which we will find more unsettled questions of principle or practice than in that of partial denture prosthesis. It would seem that these facts make the program of this section at our national gathering of vital importance. In building this program, it has been our purpose to make it a means for constructive, enlightening discussion of important subjects and not a platform for the unchallenged promulgation of any one man's ideas. The settlement of any question is dependent on a free and thorough representation of all its aspects.

O. DEFOREST DAVIS, *Chairman.*

TUESDAY, SEPTEMBER 22

2 to 5 p. m.

"Balanced Occlusion—Its Practical Application in Partial Denture Construction"

By Arthur P. Little.....St. Paul, Minn.

Synopsis—Balanced occlusion; its significance in the ideal human. Retrogressive changes giving rise to a need for partial denture restorations. Reasons for employing the principle of balanced occlusion in partial denture construction. Procedure: (*a*) mouth survey and diagnosis; (*b*) determining amount of restoration; (*c*) design to meet these needs; (*d*) element of compromise; (*e*) construction of the restoration; (*f*) instruction to patient; (*g*) maintenance necessary to keep the restoration in function. Conclusions.

To be followed by a clinic showing models, case records, etc., fully illustrating the paper.

Discussed by

Mark E. Vance.....Lincoln, Nebr.

Theodore W. Maves.....Cleveland, Ohio

"Incisal Guidance—Its Influence in Compensation and Balance"

By F. W. Frahm.....Los Angeles, Calif.

Synopsis—Consideration of incisal guidance as a fundamental principle. Its great importance in partial denture construction. The incisal movements as definite well defined factors in functional occlusion. Influence in determining corrective measures in occlusal trauma.

Discussed by

V. Clyde Smedley.....Denver, Colo.

"Porcelain—Its Application to Bridgework"

By J. E. Argue.....Seattle, Wash.

Synopsis—The form and size of porcelain pontics in fixed bridgework. The health of the tissues and its preservation. Constructing and staining the porcelain pontic to produce hygienic and esthetic effects.

To be followed by a clinic showing technical models and the various steps of construction.

Discussed by

Horace G. Whittlesey.....Mexico City, Mexico

C. O. McBean.....Los Angeles, Calif.

WEDNESDAY, SEPTEMBER 23

9 a. m. to 12 m.

"Physiology of Occlusion"

By J. Lowe Young.....New York City

Synopsis—The line of occlusion. Casts of various types of teeth showing variations in the line of occlusion (with slides). The importance of mesial and distal marginal ridges on the occlusal surfaces of the premolars and molars, with particular stress

on the danger to the investing tissues of the teeth when the marginal ridges are lost. Coordination of the teeth when they are in harmony with the line of occlusion.

Discussed by

Spencer R. Atkinson....Pasadena, Calif.

"Correction of Unbalanced Adult Occlusion"

By H. B. Washburn.....St. Paul, Minn.

Synopsis—The unbalanced condition may be the result of: (*a*) childhood irregularities that have or have not been treated by

Elks Club

an orthodontist; (*b*) extraction of first molars in one or both jaws; (*c*) certain types of dental reconstruction; (*d*) general loss of body tone due to illness.

Discussed by

A. Alfred Nelson.....Detroit, Mich.
F. W. Frahm.....Los Angeles, Calif.

2 to 5 p. m.

"Pathology of Occlusion"

By Paul R. Stillman....New York City

Synopsis—Some of the factors in the etiology of periodontal disease that occasionally follow the introduction of partial dentures, stressing the necessity of a balanced occlusion, not only for the artificial teeth but also for the natural teeth included in the restored denture. An explanation for failure even when each step in balanced occlusion has been checked in the present technic of construction.

Discussed by

A. W. Ward.....San Francisco, Calif.
Harvey Stallard.....San Diego, Calif.

"The Spherical Principle of Occlusion—Its Use in Diagnosis and Treatment of Dentofacial Deformities"

By Vernon D. Irwin.....Duluth, Minn.

Synopsis—Case records, casts, and progress pictures of practical cases. The use of interdental splints in treatment cases and their possibilities as agencies for certain corrections in deformities and habits.

To be supplemented by clinics of casts, photographs, etc.

Discussed by

Charles E. Geister.....Oklahoma City, Okla.
W. A. Coston.....Kansas City, Mo.

"Effects of Partly Immobilizing Natural Teeth in Dental Prosthesis"

By M. H. Mortonson and J. C. Mortonson .....Milwaukee, Wis.

Synopsis—The developmental period of bridgework with types constructed. Fundamental principles developed through clinical experience and observation. Rapid progress of past generation. Decrease in the construction of large fixed bridges and increase in removable pieces. Steadily widening acceptance of removable bridgework. A type of removal work embodying true principles of restoring lost dental organs. Interrelationship of human teeth from standpoint of articulation and occlusion. Interference with such relationship by improperly constructed restorations. Functional inhibition and interference produced by wrong type of replacement. Independent tooth motion: its influence on nutritional impulses essential to health of dento-environmental tissues. Effect of tooth fixation and undue leverage. Parallelism of attachments and abutments. Function and nutrition. Influence of bridgework on abutment teeth, mucosa and subjacent tissue. Practicability of a modern scientific type of bridgework.

A clinic given in the regular clinic program, and consisting of practical and clinical demonstrations, will follow this paper.

Discussed by

Hart J. Goslee.....Chicago, Ill.
James Kendall Burgess....New York City

THURSDAY, SEPTEMBER 24

9 a. m. to 12 m.

"The Physiology of the Occlusal Surfaces of the Teeth"

By Harvey Stallard....San Diego, Calif.

Synopsis—Introduction: 1. Definitions of (*a*) occlusion; (*b*) functional occlusion.

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2. Kinds of function: (*a*) active; (*b*) passive. 3. Function of occlusal surfaces—passive: (*a*) in mastication; (*b*) in maintaining occlusion; (*c*) in developing occlusion. Mastication: 1. Incision, simple, multiple. 2. Crushing and grinding (multiple incision). 3. Analysis of each in (*a*) youth; (*b*) adultness; (*c*) senescence. Maintenance of occlusion: 1. Influence of inclined planes and fossae. 2. Balanced antagonism of opposing teeth. 3. Change through wear (*a*) of occlusal surfaces; (*b*) of contact points. Development of occlusion: 1. Function of cusps and fossae. 2. Functions of the different forms of the teeth.

Discussed by

R. Ottolengui.....New York City

James Mark Prime.....Omaha, Nebr.

"Establishing Masticatory Function in a Mutilated or Deformed Mouth"

By Vern J. Smith....Los Angeles, Calif.

Synopsis—What is a mutilated or deformed mouth? Tests of masticatory efficiency. Mecanopathologic aspects of the case: (*a*) determination of degree of mutilation or deformity; (*b*) models in dynamic relation to determine amount of correction possible, and surgical procedure necessary to augment correction. General physical diagnosis. Elimination of infection and infective lesions. The general plan of a dental operation.

To be followed by a clinic in the general clinics illustrating all the various steps and conclusions of the paper.

Discussed by

Paul R. Stillman.....New York City

J. Lowe Young.....New York City

ORAL SURGERY, EXODONTIA AND ANESTHESIA

(Ball Room, Second Floor, Kosair Temple, West Entrance. All subsequent meetings will be held in the same place with the exception of the last meeting.)

OFFICERS OF SECTION

Frederick F. Molt, Chairman....Chicago, Ill.

J. A. Blue, Vice Chairman.....Birmingham, Ala.

J. P. Wahl, Secretary.....New Orleans, La.

TUESDAY, SEPTEMBER 22

2 to 5 p. m.

"Syphilitic Lesions of the Mouth"

By Paul A. O'Leary (M.D.).....Rochester, Minn.

"Nonsyphilitic Mouth Lesions"

By Gordon B. New (M.D.).....Rochester, Minn.

"Immediate Closure of Wounds of the Mouth and Jaw"

By Guy R. Harrison.....Richmond, Va.

WEDNESDAY, SEPTEMBER 23

9 a. m. to 12 m.

"A Consideration of the Essentials in Theory and Practice of Gas-Oxygen Anesthesia"
By E. I. McKesson (M.D.)
Toledo, Ohio

"A Comparison of Nitrous Oxid-Oxygen and Ethylene-Oxygen Anesthesia in Office Practice"
By John W. Seybold—Denver, Colo.

2 to 5 p. m.

"Facial Neuralgia or Tic Douloureux"
By Roy S. Hopkinson—Milwaukee, Wis.

"Impacted Teeth in Their Relation to Psychoneurosis"
By Emil L. Aison—Chicago, Ill.

THURSDAY, SEPTEMBER 24

9 a. m. to 12 m.

Combined meeting with the Section on Histology, Physiology, Pathology, Bacteriology and Chemistry (Research)

(Auditorium, Tenth Floor, Seelbach Hotel)

"Newer Knowledge of Calcium Metabolism in Health and Disease, With Special Consideration of Calcification and Decalcification Procedure, Including Focal Infection Phenomena"
By Weston A. Price—Cleveland, Ohio

ORTHODONTIA AND PERIODONTIA

(Amphitheater, Second Floor, University of Louisville College of Dentistry. All subsequent meetings to be held in the same place.)

OFFICERS OF SECTION

Olin Kirkland, Chairman
Montgomery, Ala.
B. Frank Gray, Vice Chairman
San Francisco, Calif.
W. H. Scherer, Secretary—Houston, Texas

A Message from the Chairman of the Section

To the dental profession, especially those interested in orthodontia and periodontia, a cordial invitation is extended to attend the meetings of this section. One of the most comprehensive and instructive programs that have ever been arranged for this section will be given at this meeting. Many new thoughts and theories have been recently advanced in these departments of dentistry, which will be presented to you in a comprehensive manner.

It is your privilege to attend these meetings and participate in the discussions.

OLIN KIRKLAND, *Chairman.*

TUESDAY, SEPTEMBER 22

2 to 5 p. m.

"Further Studies of the Skulls in the American Museum of Natural History with Relation to Periodontal Disease"
By Isador Hirschfeld—New York City

"Lesions of Gum Tissues and Their Relation to Vocular Hypotonus"
By Clyde M. Gearhart
Washington, D. C.

WEDNESDAY, SEPTEMBER 23

9 a. m. to 12 m.

"An Evaluation of the Work of the Dental Hygienist"
By Robin B. Adair—Atlanta, Ga.

"Etiology and Treatment of Pyorrhea, Simplified"
By Thomas B. Hartzell
Minneapolis, Minn.

"Preventive Dentistry as Taught in College"
By Harold J. Leonard
Minneapolis, Minn.

2 to 5 p. m.

"Supplemental Growth in the Mandible as a Result of Orthodontic Treatment"
By Harry E. Kelsey—Baltimore, Md.
Discussed by
B. W. Weinberger—New York City
Hugh W. McMillan—Cincinnati, Ohio

"A Method of Predetermining Tooth Movement as an Aid to the Diagnosis and Treatment of Malocclusion"
By Joseph E. Johnson—Louisville, Ky.
Discussed by
C. A. Hawley—Washington, D. C.
Charles R. Baker—Evanston, Ill.

"Report of Case"
By Oren A. Oliver—Nashville, Tenn.

THURSDAY, SEPTEMBER 24

9 a. m. to 12 m.

"An Appraisal of Present Day Orthodontic Procedure"
By Robert Dunn, collaborating with B. Frank Gray....San Francisco, Calif.
Discussed by
Milton T. Watson.....Detroit, Mich.
H. B. Tileston, Jr.....Louisville, Ky.

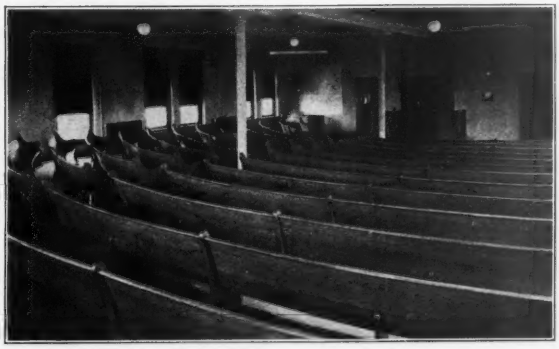
"An Orthodontic Ounce of Prevention"
By Burt Abell.....Toledo, Ohio
Discussed by
Joseph D. Eby.....New York City

"Allurement of Specialization"
By Abram Hoffman....Buffalo, N. Y.
Discussed by
B. E. Lischer.....St. Louis, Mo.
Charles R. Jackson....Indianapolis, Ind.

A Message from the Chairman of the Section

The program of the Section on Mouth Hygiene and Preventive Dentistry has been selected and prepared with the idea of covering, as thoroughly as possible, all phases of mouth hygiene and preventive dentistry. Having in mind the increasing attention given to mouth hygiene and preventive dentistry by both the profession and the laity, we invite every member of the American Dental Association attending the meeting at Louisville to spend at least half a day with the Mouth Hygiene and Preventive Dentistry Section.

C. J. HOLLISTER, *Chairman.*



Amphitheater, University of Louisville Dental Department

MOUTH HYGIENE AND PREVENTIVE DENTISTRY*

(Y. M. C. A. Auditorium. All subsequent meetings will be held in the same place.)

OFFICERS OF SECTION

C. J. Hollister, Chairman....Harrisburg, Pa.
R. S. Towne, Vice Chairman.....Bismarck, N. D.
N. Talley Ballou, Secretary....Richmond, Va.

*All papers limited to fifteen minutes; discussions limited to three minutes.

TUESDAY, SEPTEMBER 22

2 to 5 p. m.

"Forsyth Program, Based on Nine Years' Experience"
By Harold DeWitt Cross....Boston, Mass.

"Place of Dental Health in a General Health Program"
By A. T. McCormack (M.D.).....Louisville, Ky.

"The Relation of the Dental Hygienist to the Dental Profession and Public"
By Edith C. Hardy (D.H.).....Rochester, N. Y.

"Operative Technic for the Conservation of Deciduous Teeth"
By Harris R. C. Wilson.....Cleveland, Ohio

Discussed by
Alfred Owre.....Minneapolis, Minn.
Harvey J. Burkhart.....Rochester, N. Y.
Thaddeus P. Hyatt.....New York City

WEDNESDAY, SEPTEMBER 23

9 a. m. to 12 m.

"Lay Education Activities of a District Dental Society"
By E. Denton White.....Minneapolis, Minn.

"Plans for and Results of a State-Wide Dental Health Week"
By C. J. Hollister.....Harrisburg, Pa.

"Plans for Cooperation Between Mouth Hygiene Committees and Official and Unofficial Health Agencies"
By Evelyn C. Schmidt.....Chicago, Ill.

"Dental Educational Work Among Civic Groups"
By John P. Buckley.....Los Angeles, Calif.

Discussed by
H. L. Banzhaf.....Milwaukee, Wis.
B. Lucien Brun.....Baltimore, Md.
Sidney J. Rauh.....Cincinnati, Ohio
L. Pierce Anthony.....Philadelphia, Pa.

2 to 5 p. m.

"The Present Legal and Professional Status of the Dental Hygienist"
By Guy S. Millberry.....San Francisco, Calif.

"The Future of the Dental Hygienist in Public Health Work"
By Alfred C. Fones.....Bridgeport, Conn.

"Clinical Results from Periodic Prophylactic Treatments"
By Gillette Hayden.....Columbus, Ohio

"The Conservation of the First Permanent Molar"
By Thaddeus P. Hyatt.....New York City

Discussed by
Anna V. Hughes.....New York City
Arthur D. Black.....Chicago, Ill.
Celia Rich.....Nashville, Tenn.

THURSDAY, SEPTEMBER 24

9 a. m. to 12 m.

"Suggested Methods for Teaching Mouth Hygiene and Nutrition"
By Rose E. House (D.H.).....Bridgeport, Conn.

"Fundamentals of Nutrition and Results of Research"
By Mariel Hopkins.....Louisville, Ky.

Tyler Hotel

"Some Conclusions Concerning the Etiology of Dental Caries"
By Russell W. Bunting.....Ann Arbor, Mich.

"State Program of Sheppard-Towner Unit for Preventive Dental Education"
By G. H. Wandel.....Iowa City, Iowa

Discussed by
N. Talley Ballou.....Richmond, Va.
R. S. Towne.....Bismarck, N. D.
C. H. Schott.....Cincinnati, Ohio

HISTOLOGY, PHYSIOLOGY, PATHOLOGY, BACTERIOLOGY AND CHEMISTRY (RESEARCH)

(Auditorium, Tenth Floor, Seelbach Hotel. All subsequent meetings will be held in the same place.)

OFFICERS OF SECTION

Weston A. Price, Chairman.....Cleveland, Ohio

Russell W. Bunting, Vice Chairman.....Ann Arbor, Mich.

Edward H. Hatton, Secretary.....Chicago, Ill.

A Message from the Chairman of the Section

In submitting the program of this section, the officers would emphasize that, while the practice of dentistry has been changing rapidly in the past, the changes in the immediate future will be far more rapid. The newer knowledge that is developing will make possible professional service as a preventive program, such as has not been possible in the past because of lack of fundamental data. In the past, most of the emphasis regarding the injurious effects of dental infections has related to pulp and root end infections, with relatively little detailed emphasis, based upon dependable data, concerning the important rôle that gingival infections play. We are now coming to realize that many of the serious breaks of middle life are related to a change in the balance between systemic defense and gingival infections, making the individual subject to a slow but progressive degenerative process in one or several organs or tissues of the body, which may be the principal or contributing factor in a premature break in health. Various of the workers under grants from the Research Commission will give reports of progress, which will be of double interest, because of the intrinsic value of the message and because of our general interest in what is being accomplished with the contribution that was made for that purpose by each member of the American Dental Association.

WESTON A. PRICE, *Chairman.*

TUESDAY, SEPTEMBER 22

2 to 5 p. m.

"Pathology of Pyorrhea"
By William G. Skillen and associates.....Chicago, Ill.

"Pyorrhea: Etiology and Pathology. The Results of Group Research at the University of California"
By F. V. Simonton.....San Francisco, Calif.

"Effects of a Deficiency of the Antiscorbutic Factor and of Fat-Soluble A in Guinea-Pigs and Rabbits"
By Burt S. Wolbach, (M.D.), and Percy R. Howe.....Boston, Mass.

WEDNESDAY, SEPTEMBER 23

9 a. m. to 12 m.

"The Virulence of Streptococci Recovered from Apical Infections"
By Anna C. Nichols (B.S., M.S.) and associates.....Chicago, Ill.

"The Bacteriology of Apical Infections"
By U. G. Rickert.....Ann Arbor, Mich.

"Further Observations on the Detoxification of Bacterial Toxins"
By Thomas B. Hartzell and W. P. Larson (M.D.).....Minneapolis, Minn.

"Blood Uric Acid and Its Relationship to the Diagnosis of Focal Infection"
By Emil Mueller.....Chicago, Ill.

2 to 5 p. m.

"The Capillaries of the Enamel and Their Relation to Mottled Teeth"
By Theodore B. Beust.....Louisville, Ky.

"Further Studies on the Relation of Dentistry to Psychopathology"
By E. A. Thomas.....Hastings, Nebr.

"Anatomy and Pathology of the Maxillary Sinus"
By Harry A. Boyne.....Omaha, Nebr.

THURSDAY, SEPTEMBER 24

9 a. m. to 12 m.

Combined Meeting with the Section on Oral Surgery.

"Newer Knowledge of Calcium Metabolism in Health and Disease with Special Consideration of Calcification and Decalcification Processes Including Focal Infection Phenomena"
By Weston A. Price.....Cleveland, Ohio

CLINIC PROGRAM

(Kosair Temple and University of Louisville College of Dentistry.)

Harold S. Smith, General Chairman.....Chicago, Ill.

William E. Goepper, Local Chairman.....Louisville, Ky.

The following is a preliminary program only, of clinics to be given at the annual session of the American Dental Association, Louisville, Ky., September 21-25. Owing to the fact that many of the state societies meet this year at a late date, their officers have been unable to complete their lists of clinics, and have requested more time in which to submit names and subjects of their clinicians. A full and complete list will be published later.

Clinics will consist of the following types: (1) state individual clinics; (2) section clinics; (3) group and study club clinics; (4) junior clinics.

All clinicians must have the endorsement of the president of their respective state societies.

The Clinic Committee extends a cordial welcome to members of the American Dental Association to take part in this program and trusts that every state will be fully represented.

SECTION CLINICS

Section One

Operative Dentistry, Materia Medica and Therapeutics

"Porcelain Jacket Crowns"
By Carlisle C. Bastian.....New York City

"Gold Foil"
By Frank D. Burns.....Denver, Colo.

Chicago Unit:

"Progressive Amalgam Clinic"
By O. J. Olafsson
S. H. Nannestad
L. L. Burroughs
J. F. Gilmeister
G. E. Cartwright
H. F. Jahnke

Synopsis—Some new and improved details in the procedure of amalgam technic: 1. Cavity preparation. 2. Mixing and plasticity. A thorough mix is essential to the stability of the completed filling. Proper plasticity is necessary for perfect adaptation. 3. Tamping: a process for eliminating all air voids, likened to the agitation or jarring of a semifluid mass. 4. Orderly condensation, which has for its purpose equal packing in all parts of the filling. 5. Stepping the cavity walls. Elimination of final excess mercury and small imperfections at the danger points around the cavity walls.

Section Two

Full Denture Prosthesis

"Staining, Etching, Grinding and Baking of Individual Teeth for Esthetic Purposes in Prosthodontia"
By Milton Cohen.....New York City

"Correction Technic. (*a*) Centric Occlusion (*b*) Centric Relation (*c*) Intermediate Occlusion (*d*) Balanced Occlusion"
By Rudolph L. Hanau.....Buffalo, N. Y.

"Color and Esthetic Arrangement of the Teeth in Prosthesis. (*a*) Hue (*b*) Form (*c*) Size (*d*) Arrangement"
By E. B. Owen.....St. Louis, Mo.

Section Three

Partial Denture Prosthesis

"The Spherical Principle of Occlusion—Its Use in Diagnosis and Treatment of Dentofacial Deformities"
By Vernon D. Irwin.....Duluth, Minn.

"Effects of Partly Immobilizing Natural Teeth in Dental Prosthesis"
By M. H. Mortonson and J. C. Mortonson.....Milwaukee, Wis.

"Establishing Masticatory Function in a Mutilated or Deformed Mouth"
By Vern J. Smith.....Los Angeles, Calif.

Section Five

Orthodontia and Periodontia

"Periodontoclasia: Diagnosis and Prophylactic Instruction"
By H. Clay Hassell....Tuscaloosa, Ala.

"Surgical Periodontia: Clearing Up Deep Pathologic Areas"
By Frank C. Pague.....
.....San Francisco, Calif.

Seelbach Hotel

"Occlusion and Nutrition in Periodontoclasia"
By E. Melville Quinby....Boston, Mass.

"Technical Procedures of Proven Value Useful in Periodontia"
By Robin B. Adair.....Atlanta, Ga.

"Traumatic Occlusion"
By C. B. Fowlkes.....New York City

"Practical Application of Periodontia to General Practice"
By Clayton H. Gracey....Detroit, Mich.

"Treatment of Periodontoclasia"
By Alice G. H. Duden..Indianapolis, Ind.

"Home Care of the Mouth"
By Robert L. Dement.....Atlanta, Ga.

"Rapid Orthodontia, Application of Bridge-Work, and Other Mechanical Procedures to Aid in the Treatment of Riggs Disease" (with lantern slides)
By Howard T. Stewart.....
.....New York City

Section Six

Mouth Hygiene and Preventive Dentistry

"Clinical Procedure for Treatment of the First Permanent Molar"
By Thaddeus P. Hyatt....New York City

"Dental Hygiene for Children as Practiced in the Public Schools of Pennsylvania"
By Leona M. Mitchell (D.H.).....
.....Harrisburg, Pa.

"Operative Technic for the Conservation of the Deciduous Teeth"
By Harris R. C. Wilson and Guy Shubert Lerch.....Cleveland, Ohio

Section Seven

Histology, Physiology, Pathology, Bacteriology and Chemistry (Research)

Group One:

"Ultraviolet Radiation Phenomena, Their Sources and Practical Applications in Corrective and Preventive Dentistry. (Darkened room exhibition.)
By Weston A. Price....Cleveland, Ohio

"Researches on Diets"
By Percy R. Howe.....Boston, Mass.

Group Two:

"Researches on Pyorrhea"
By F. V. Simonton.....
.....San Francisco, Calif.

"Relationship of Injury to Pyorrhea"
By William G. Skillen.....Chicago, Ill.

"Virulence of Streptococci Found in Mouth Infection"
By Anna C. Nichols (B.S., M.S.)....
.....Chicago, Ill.

Group Three:

"Etiology of Brown Stain"
By Theodore B. Beust....Louisville, Ky.

Thursday, September 24

2 to 5 p. m.

GROUP AND STUDY CLUB CLINICS

Indiana

Crown and Bridge Section of the Indianapolis Dental Society Clinic Study Clubs.

"Anatomy and Physiologic Function of Teeth"'

Group 1.

By F. A. Hamilton
J. W. Puffer
L. S. Fall
R. L. Bosler
Christian Olsen
E. C. Baker
J. B. Carr
G. B. Wolfe

Group 2.

By W. I. McCullough
E. S. Gilchrist
E. R. Denforth
D. G. Lamb
J. F. Johnston
E. J. Rodgers
J. L. Wilson

Kansas

TOPEKA GROUP

"Bridge Clinics; Indirect Method, Showing Steps From Impression Taking to Finished Product."
By A. J. Buff
E. E. Ramsey
E. E. Carpenter
T. P. Capps
L. C. Osborn
L. M. Fleisch
H. H. Cook
E. E. Welch

Kentucky

GREEN RIVER UNIT *(Owensboro):*

"Amalgam Restorations: (1) Cavity preparation; (2) Manipulation; (3) Inserting filling; (4) Finishing.
By O. D. Wilson
G. L. Burke
J. P. Hild
H. B. Harris

Mississippi

"Bridgework"
By J. H. Brown.....Newton
G. T. Maynes.....Laurel
R. S. Neyland.....Jackson

Missouri

KANSAS CITY GROUP

"Crown and Bridge"
By R. J. Rinehart, Chairman
R. M. Seibel
J. C. Warnock
C. E. Burgson
V. V. Bele
P. F. Gilbreath
Earl Westenhaver
F. E. Byers
Lester N. Glaze

ST. LOUIS STUDY CLUB OF DENTISTRY

The St. Louis Study Club of Dentistry was organized in January, 1919, and has been in continuous operation since that time. The object of this institution is to provide postgraduate courses to ethical dentists. Owing to the fact that the instructors and officers of the Study Club receive no remuneration for their services, it is possible to conduct the classes without charge to the students.

This educational organization should be distinguished from those clinic groups or study clubs that have been established for the purpose of producing clinical material or for carrying on a special line of work.

The following clinics represent the class work of the students under the guidance of the instructors, and were not especially prepared for this meeting.

1. Cavity Preparation and Casting Technic
   E. R. Hart and G. G. Riefling, Instructors

This group will show a definite technic for making inlays and three-quarter crowns, as follows:

(*a*) Cavity preparation
(*b*) Wax patterns
(*c*) Investing
(*d*) Finishing inlays and three-quarter crowns

2. Fixed and Removable Bridgework
   G. B. Scott, Instructor

In this section will be shown various types of attachments, supports and construction.

3. Conduction and Local Anesthesia

A. C. Engel and W. H. Wells, Instructors

This group has been arranged with the idea of presenting the fundamental principles necessary for producing conduction and local anesthesia. These are:

(*a*) Sterilization and equipment
(*b*) Tuberosity and posterior palatine injection
(*c*) Mandibular and mental injection
(*d*) Infra-orbital, anterior palatine and infiltration injections

4. Porcelain Technic

Malcolm Robb, Instructor

This group will demonstrate the following:

(*a*) Plaster Models
(*b*) Flat back facing
(*c*) Porcelain stubs
(*d*) Dowel crown
(*e*) Jacket crown

5. Full Dentures

E. B. Owen and B. O. Haun, Instructors

In this section will be shown

(*a*) Making compound-plaster impressions
(*b*) Boxing and running casts
(*c*) Adapting base-plates
(*d*) Mounting on articulator
(*e*) Finishing case
(*f*) Casts, illustrating
  (1) Edentulous cases
  (2) Natural teeth, showing peculiarities of tooth arrangement
  (3) Artificial dentures, reproducing the irregularities found in teeth
  (4) Cases in which surgical interference is indicated

6. Operative Dentistry

R. C. Seibert and J. W. Ford, Instructors

In this group, the following will be shown:

(*a*) Cavity preparation for amalgam
(*b*) Formation and application
(*c*) Mixing and plasticity
(*d*) Insertion of amalgam
(*e*) Air pressure tests for condensation and adaptation
(*f*) Scleroscopic readings of amalgam, showing its increased and decreased strength when mixed and manipulated by certain methods
(*g*) Cavity preparation for silicates
(*h*) Reinforced silicate restorations
(*i*) Cavity preparation for gold fillings
(*j*) An improved set of gold pluggers

7. Root Canal Technic

W. A. Chamberlain, Instructor

Under this heading, there will be the following:

(*a*) Diagnosis
(*b*) Preparation
(*c*) Filling
(*d*) Asepsis

PENNSYLVANIA

PITTSBURGH GROUP

"Embryonic Tooth Development"
By W. F. Swanson
L. E. Van Kirk
T. W. Brand

TENNESSEE

Study Club Clinic

ROOT CANAL CLUB, SECOND DISTRICT DENTAL SOCIETY (Knoxville)

"Ionization and Root Canal Filling by Defusion"
By J. Gulford Sharp
H. M. A. Smith
Harry M. Underwood
William B. Clotworthy

VIRGINIA

THE VIRGINIA DENTAL STUDY CLUB

"Partial and Full Dentures"

(*a*) "Partial Dentures by an Indirect Method"
By M. B. Rudd.....Richmond
R. H. Bruni.....Richmond
C. C. Vaughn, Jr.....Richmond
T. W. Wood.....Richmond

Synopsis—An accurate and simple technic for making sectional impressions and plaster bite; the designing and construction of stress-breakers; finishing. By this method, the case may be completed after the impressions and bite have been taken. The finished case will fit accurately without any material adjustments.

(*b*) "Full Dentures"
By W. R. Dodd.....Richmond
A. C. Wright.....Richmond
G. W. Holliday.....Richmond
G. W. Duncan.....Richmond

"Fixed Bridges"
By R. L. Simpson.....Richmond
T. F. Epes.....Roanoke
H. G. Russell.....Richmond
C. B. Pearson.....Richmond
H. F. Sommardahl.....Roanoke

"Jacket Crowns, Root Extensions, Pontics and Attachments"
By R. H. Jeffries.....Richmond
R. I. Pusey.....Richmond
A. O. James.....Richmond

Friday, September 25

STATE INDIVIDUAL CLINICS

9 a. m. to 12 m.

Alabama

"Detail Technic of Cast Metal Base"
By A. K. Parks.....Montgomery

"Indirect Method of Casting Inlays on Plaster Models"
By A. K. Franklin.....Birmingham

Colorado

"Results Obtained Through the Orthodontist Closing Spaces"
By A. H. Ketcham.....Denver

"Alveolotomy"
By M. R. Howard.....Denver

District of Columbia

"Logical Casting Technic"

"Gold Inlays and Other Small Castings"
By R. C. McCullough.....Washington, D. C.

Georgia

"Porcelain Jacket Crowns and Porcelain Roots"
By S. P. Jones.....Atlanta

"Treatment of Pyorrhea by the General Practitioner with Assistance of Dental Hygienist"
By R. E. Cunningham.....Elberton
N. G. Slaughter.....Athens

Illinois

"Some Uses of the Knife Edge Carborundum Stone in Everyday Operative Procedure"
By Arthur G. Smith.....Peoria

"Partial Dentures — Removable Bridgework—One Piece Castings"
By Polk E. Akers.....Chicago

"Full Denture Prosthesis"
By R. O. Schlosser.....Chicago
Assisted by
Justine G. Schlosser.....Chicago

A lecture demonstration and table clinic showing by charts and specimens steps in full denture construction covering diagnosis, impressions, registration of facial dimensions and jaw relation along with methods of tooth arrangement.

"Block Anesthesia as Applied to Exodontia and Cavity Preparation"
By Howard C. Miller.....Chicago

"Treatment of Diseases of the Periodontal Membrane"
By F. W. Merrifield.....Chicago
G. R. Lundquist.....Chicago

"Orthodontic Diagnosis"
By Ricardo S. Salazar.....Chicago

"Local Anesthesia Demonstrated on Wet Anatomic Specimens"
By Ralph H. Fouser.....Chicago

"Full Denture Prosthesis"
By William S. Heermans and group
.....Chicago

A progressive group clinic covering consecutive steps in full denture prosthesis by the Chicago Prosthetic Clinic Club.

"Malocclusion Produced by Abnormal Muscular Pressure: Tongue Habit, Thumb Sucking, and Mouth Breathing"
By James W. Ford.....Chicago

"Chayes' Movable-Removable Bridgework, Showing Cases in the Mouth of a Patient"
By Thomas P. Rose.....Chicago

"Gold Inlays with Porcelain Veneer (Baked Porcelain)"
By D. H. Baldwin.....Peoria

"Diseased Jaw Bones and the Associated Roentgenograms"
By Edward H. Hatton.....Chicago

"Impression Taking and the Rebasing of Full Dentures"
By E. C. Pendleton.....Chicago

"Gold Inlays"
By Albert P. Grunn.....Chicago

Finished and unfinished cast gold inlays using the Knapp method of wax elimination, with automatic wax eliminator, giving the technic in detail from cavity preparation to finish of inlay.

"Root Canal Therapy"
By J. R. Blayney.....Chicago

An exhibit of case histories, both clinical and roentgenographic, illustrating progress of cases using various types of treatment.

"Inlay Technic"
By V. T. Nylander.....Chicago

Cavity preparation; matrix and wax manipulation; investing, burning out of wax, and casting procedure.

"Crowns and Bridges"
By S. D. Tylman.....Chicago

Various types of abutments, pontics and bridges will be shown; results of clinical data will be exhibited including roentgenograms and study models.

Indiana

"Fixed Bridgework"
By John G. Hogan.....Bedford

"A Study of Full Denture Articulation"
By Robert R. Gillis.....Hammond

"Removable Cast Bridge Using Akers' Technic"
By G. M. Terrill.....Lawrenceburg
C. R. McWethy.....Dillsboro

"Pinledge Bridge Attachment for Anterior Teeth"
By H. J. Longcamp.....Aurora
J. E. Cole.....Aurora

"Removable Bridge and Partial Dentures"
By P. L. Riggs.....Lowell

(1) "Porcelain Strike Sanitary Fixed Bridgework, Articulating with Full Upper Denture. (2) "Steps in Construction of Full Upper Swaged Gold Denture"
By R. H. Hopkins.....Indianapolis

Iowa

"Three Quarter Crown for Bridge Attachments on the Lower Lateral Incisor, Conserving Tooth Structure"
By L. W. Snuggins.....Des Moines

"Slice Cavity Preparation for Inlays"
By H. B. Haselton.....Des Moines

Topic to come
By C. M. Work.....Ottumwa

Kansas

"Swaged Clasps for Partial Dentures"
By George P. Williams.....Topeka

Kentucky

"Grinding the Articulation of Full Dentures"
By W. W. Wilkinson.....Paducah

"Modeling Compound Technic"
By I. V. Duell.....Louisville

"A Simplified, Inexpensive Method of Correcting All Malocclusions"
By Joe W. Ford.....Bowling Green

"Partial Dentures, Cast on Model Technic"
By L. C. Burgard.....Louisville

Maine

"(*a*) Practical Uses for Carved Porcelain in the Modern Office. (*b*) Inlay and Three Quarter Crown Preparation. (*c*) Removable and Fixed Bridgework"
By George J. Anderson.....Portland

"A Plea for Better Dental Roentgenography"
By Rupert S. Lovejoy.....Portland

MARYLAND

"Full Denture Prosthesis"
By A. H. Paterson.....Baltimore

MASSACHUSETTS

"Orthodontia by the Removable Jackson Appliance: (*a*) Base Metal Appliance. (*b*) Gold Appliance. (*c*) Jackson Removable Retainer"
By William H. Gilpatric.....Boston

"Technical Factors in the Production of Roentgenograms"
By Herman Osgood.....Boston

MISSISSIPPI

"Dental Surgery" (Table clinic)
By Rush P. Abbott.....West Point

"A New Tooth Facing for Bridgework"
By H. D. Chipps.....Corinth

"Facial Measurements as an Aid in Establishing and Maintaining Proper Relation of Jaws in Prosthetic Restorations; Some Practical Hints"
By C. A. Moore.....Lexington

MISSOURI

"How We Determine Which Teeth to Treat and Which to Extract, With a Method of Enlarging, Treating and Filling Canals, Without Periapical Injury"
By Edouard M. Hall.....Kansas City

"A Method of Securing Central Occlusion"
By Dayton Dunbar Campbell.....Kansas City

"Wax Spray Method for Facial Casts; A New Technic of Interest to Orthodontists, Prosthodontists and Plastic Surgeons"
By E. H. Golden.....St. Louis

"Some Phases of Bridgework"
By E. E. Haverstick.....St. Louis

"Attachments for Partial Dentures: Lingual Grips in Conjunction With Inlays"
By G. B. Scott.....St. Louis

"Removable Bridgework. Replacing Lost Teeth Distal to Cuspids"
By C. P. Crosby.....St. Louis

"Cephalometric Denture Mensuration"
By B. E. Lisher.....St. Louis

NEVADA

"Partial Denture Construction"
By W. H. Cavell.....Carson City

"Cavity Preparation for Gold Inlays"
By Edward F. Dunbar.....Fallon

NORTH CAROLINA

"Anatomic Restorations Emphasizing Occlusions"
By E. B. Howle.....Raleigh

"Porcelain Pontic Bridges with Special Reference to the Cast Attachments"
By J. A. McClung.....Winston-Salem

"Inlay Work"
By T. Edgar Sikes.....Greensboro

NORTH DAKOTA

"The Relationship of Tooth Form to the Physiologic and Pathologic Conditions of the Investing Tissues"
By H. C. Cooper.....Abercrombie

OKLAHOMA

"Movable, Removable Denture"
By W. D. Rush.....Cleveland

"Partial Denture, Compound Impression"
By J. W. Chiles.....Stillwater

PENNSYLVANIA

"A Simplified Technic for Taking Impressions in Edentulous Mouths"
By Charles A. Reith.....Pittsburgh

"A Hollow Cast Gold Shell for Building Up Broken Down Roots, and for Bridge Pontics"
By C. L. Kemery.....Pittsburgh

"A Definite Root Canal Technic"
By E. G. Meisel.....Pittsburgh

"Porcelain Jacket Crown Attachment for Bridgework"
By W. J. Robinson.....Philadelphia

"Operative Dentistry for Children"
By G. C. Tassman.....Philadelphia

"Indirect Inlays, Bridges and Inlay Attachments"
By C. S. Zeisse.....Philadelphia

"Porcelain Restorations"
By Paul Simonsen.....Philadelphia

Subject to come
By A. F. Jackson.....Philadelphia

"Easy Removal of Fractured Roots, Demonstrating Displacement Instrument"
By Fred D. Miller.....Altoona

TENNESSEE

"Diet"
By L. J. McRae.....Memphis

"New Method of Constructing Combination Plates; Also Mode of Casting Metal Plate of Uniform Thickness"
By W. H. Richards.....Knoxville

"A Study of Organisms Found in Dental Infections With a View of Helping Make a More Definite Diagnosis"
By George F. Seeman.....Nashville

"Porcelain Root Technic"
By J. A. Gardner.....Memphis

UTAH

"Dental Roentgenographic Technic" (Motion picture)
By E. W. Browning.....Salt Lake City

VIRGINIA

"A Simplified Technic for Reproducing Teaching and Clinic Models"
By A. M. Walsh.....Richmond
P. L. Chevalier.....Richmond

Friday, September 25

STATE JUNIOR CLINICS

9 a. m. to 12 m.

GEORGIA

"Crown and Bridgework with Special Form of Pontic"
By W. A. Garrett.....Atlanta

KENTUCKY

"Pulp Capping to Save Six Year Molars"
By L. G. Miller.....Louisville
C. D. Houze.....Louisville

"Porcelain Jacket Crowns"
By J. B. Hutcheson.....Louisville

"Noncohesive Foil Filling"
By Robert Overstreet.....Louisville

"Impression Technic for Full Dentures"
By B. L. Keeney.....Princeton

TENNESSEE

"Orthodontia"
By C. B. Wood.....Knoxville

"Dentures"
By C. E. Arnold.....Jackson

"Castings"
By H. D. Jaynes.....Knoxville

TEXAS

"Cavity Preparation, Manipulation and Finishing Amalgam Restorations"
By J. P. Murphy.....Dallas

THE LOUISVILLE SESSION

THIRD INTERNATIONAL MOUTH HYGIENE LUNCHEON AND CONFERENCE

(Ball Room, Brown Hotel)

Wednesday, September 23

12:05 to 12.58 p. m.

Harvey J. Burkhart, Chairman.....Rochester, N. Y.

A special invitation is extended to all those interested in Public Health. Luncheon tickets, $1.50, on sale at all information booths and Brown Hotel. Each speaker will be limited to six minutes.

"The Interest of the American Dental Association in Mouth Hygiene"
By C. N. Johnson.....Chicago, Ill.

"The Work of the Council on Mouth Hygiene"
By William R. Wright.....Jackson, Miss.

"The Teaching of Oral Hygiene and Its Results in Bridgeport"
By Alfred C. Fones.....Bridgeport, Conn.

"The Department of Dental Health Education of the American Dental Association"
By Evelyn C. Schmidt.....Chicago, Ill.

"The Dentist and Community Health Service in Pennsylvania"
By C. J. Hollister.....Harrisburg, Pa.

"Oral Hygiene and Its Relation to Life Insurance"
By Thaddeus P. Hyatt.....New York City

"The Future of Preventive Dentistry and Oral Hygiene in Institutional Work"
By Harold DeWitt Cross.....Boston, Mass.

"Oral Health in Industry"
By E. L. Pettibone.....Cleveland, Ohio

"Conservation From Birth to Ten Years of Age"
By Max M. Eble.....Louisville, Ky.

MENU

Sweet Mixed Pickles
Half Chicken Fried in Butter
Potato Croquettes Peas in Cream
Sliced Tomatoes
Ice Cream Cakes
Coffee

BROADCASTING LECTURES FROM WHAS, LOUISVILLE, KY.

Saturday, September 19, 8 p. m.....Evelyn C. Schmidt, Chicago, Ill.

Monday, September 21, 4 p. m.....Sheppard W. Foster, Atlanta, Ga.

Tuesday, September 22, 4 p. m.....Henry L. Banzhaf, Milwaukee, Wis.

Tuesday, September 22, 8 p. m.....C. N. Johnson, Chicago, Ill.

Wednesday, September 23, 8 p. m.....A. D. Black, Chicago, Ill.

LUNCHEON CLUB SPEAKERS

Tuesday, September 22, 12:15 p. m.

Optimists Club: E. L. Pettibone, Cleveland, Ohio; J. M. Prime, Omaha, Nebr.
(Elks Club, Third and Chestnut Sts.)

Lions Club: H. J. Crume, Eldorado, Ark.; Guy S. Millberry, San Francisco, Calif.
(Brown Hotel)

Cooperative Club: Wallace Seccombe, Toronto, Canada; Thomas P. Hinman, Atlanta, Ga.
(Elks Club, Third and Chestnut Sts.)

Wednesday, September 23, 12:15 p. m.

Kiwanis Club: A. W. Thornton, Montreal, Canada; John P. Buckley, Los Angeles, Calif.
(Brown Hotel)

American Business Club: R. J. Rinehart, Kansas City, Mo.; L. M. Waugh, New York City.
(Elks Club, Third and Chestnut Sts.)

Thursday, September 24, 12:15 p. m.

Rotary Club: H. E. Freisell, Pittsburgh, Pa.; Donald M. Gallie, Chicago, Ill.
(Brown Hotel)

JEFFERSON COUNTY MEDICAL SOCIETY MEETING

The regular meeting of the Jefferson County Medical Society will be held on Monday night, September 21, at the city hospital. A paper entitled "Important Surgical Problems of the Mouth and Face" will be presented by William H. G. Logan, Chicago, Ill.

THE LOUISVILLE DENTAL HEALTH PROGRAM

The Council on Mouth Hygiene and Public Instruction offers the following preliminary program for the Louisville meeting:

First, a dental health exhibit which will embody a varied number of teaching methods developed by experienced mouth hygiene workers throughout the country. At this exhibit, anyone with an average imagination can find an educational plan that will exactly fit his or her community requirements in mouth hygiene publicity. Those in charge of the exhibit will be glad to offer practical advice to all who are interested in this work. The exhibit will be in charge of Drs. E. L. Pettibone, Cleveland, Ohio, and Raymond E. Grant, Louisville, Ky.

Brown Hotel

Second, a mouth hygiene luncheon program at the Brown Hotel, 12:05 to 12:58 p. m., Wednesday, arranged and presided over by Harvey J. Burkhart. This feature will no doubt attract the largest and most enthusiastic crowd of mouth hygiene workers ever assembled at a meeting of the American Dental Association, as the program will include the following speakers: C. N. Johnson, Chicago, Ill.; Harold DeWitt Cross, Boston, Mass.; A. C. Fones, Bridgeport, Conn.; Thaddeus P. Hyatt, New York City; Evelyn C. Schmidt, Chicago, Ill.; C. J. Hollister, Harrisburg, Pa., and E. L. Pettibone, Cleveland, Ohio.

W. R. WRIGHT, *Chairman,*
Council on Mouth Hygiene and Public Instruction.

THE HEALTH EXHIBIT

The Fourth Annual Health Exhibit presented by the Council on Mouth Hygiene and Public Instruction will be held in the Exhibit Hall, Kosair Temple, adjacent to the commercial exhibits and at the center of the Session's activities. It will be open not only to the profession, but also to the public.

There will be exhibits by the state dental societies, state departments of health, dental hygienists, and by many national health associations. These exhibits will be more attractive, more instructive and more educational than in any health exhibit presented heretofore.

More information that will be of benefit in your practice and to your community can be gathered here than can be found in any other activity at the Louisville meeting. Each exhibit will be in charge of an experienced worker, who will be thoroughly familiar with the workings of the organization that he represents.

It will be possible to learn how dental clinics are conducted in schools, institutions, industries and hospitals. The dental hygienists' exhibits will demonstrate their activities in the schools, hospitals, factories, homes and dental offices, and in connection with playgrounds, institutions, dental ambulances and community activities.

The American Medical Association will be represented by their propaganda department, which will demonstrate the menace of patent medicines and other quackery.

The Red Cross, the National Tuberculosis Association and the National Child Welfare Association will demonstrate their activities as related to our profession.

The National Association for the Control

of Cancer will demonstrate the menace of cancer.

The National Safety Council will show wherein their activities parallel ours along health lines, and will further demonstrate their other life saving activities.

Many local child helping and health organizations will present their methods and a real message for you to take home with you to your community.

You owe it to yourself and your neighbors to visit the Health Exhibit, Main Floor, Kosair Temple.

E. L. PETTIBONE, *Chairman.*

SEVENTH INTERNATIONAL DENTAL CONGRESS BANQUET

The officers, the Organization Committee, the officers of the sections, the Committee on Essayists and Clinicians from European Nations, the International Interpreting Counselors, the Publicity Committee, the Committee on Local Arrangements, the Committee on Historical and Scientific Exhibits, the Committee on Commercial Exhibits and the state advisory committees of the Seventh International Dental Congress will hold a conference and banquet in the Ball Room, Brown Hotel, Louisville, Ky., Sunday, September 20, at 6:30 p. m.

A special call and invitation will be issued giving specific information regarding the nature of the program and also enclosing a return card, which must be signed and returned in order to make due reservation for the banquet.

The importance of this conference cannot be overestimated, for the detailed reports and plans will be presented relative to the great Seventh International Dental Congress to be held in Philadelphia, Pa., U.S.A., Aug. 23-28, 1926, in conjunction with the sesquicentennial celebration of American independence.

WILLIAM H. G. LOGAN, *President,*
OTTO U. KING, *Secretary-General.*

ANNOUNCEMENTS

ANNUAL MEETING OF INDUSTRIAL DENTISTS

The National Association of Industrial Dentists will hold its annual meeting Wednesday, September 23, at 4 p. m., in the Brown Hotel.

E. L. PETTIBONE, *President.*

AMERICAN DENTAL ASSOCIATION'S HEALTH EXHIBIT

The Department of Dental Health Education of the American Dental Association will have an exhibit of the educational material that is now available. Reprints, pamphlets, posters, charts, graphs, still pictures, picturol machine, motion pictures and unit exhibits on various phases of the dental problem will be shown.

EVELYN C. SCHMIDT, *Director,*
Chicago, Ill.

AMERICAN COLLEGE OF DENTISTS ANNUAL MEETING

The sixth annual dinner and convocation of the American College of Dentists will be held, Wednesday, September 23, at 6:00 p. m., in the Auditorium, Seelbach Hotel.

H. E. FRIESELL, *President,*
Pittsburgh, Pa.
ALBERT L. MIDGLEY, *Secretary,*
Providence, R. I.

FRATERNITIES

Fraternity headquarters are as follows: Xi Psi Phi, Watterson Hotel; Delta Sigma Delta, Seelbach Hotel; Psi Omega, Kentucky Hotel.

E. C. HUME, *Chairman,*
Louisville, Ky.

PAST PRESIDENTS' LUNCHEON

The past presidents of the American Dental Association will hold a luncheon Tuesday, September 22, at 12:15 p. m., at the Brown Hotel in Private Dining Room No. 3.

JOHN P. BUCKLEY, *Chairman,*
Los Angeles, Calif.
WILLIAM A. GIFFEN, *Secretary,*
Detroit, Mich.

AMERICAN DENTAL ASSISTANTS' ASSOCIATION

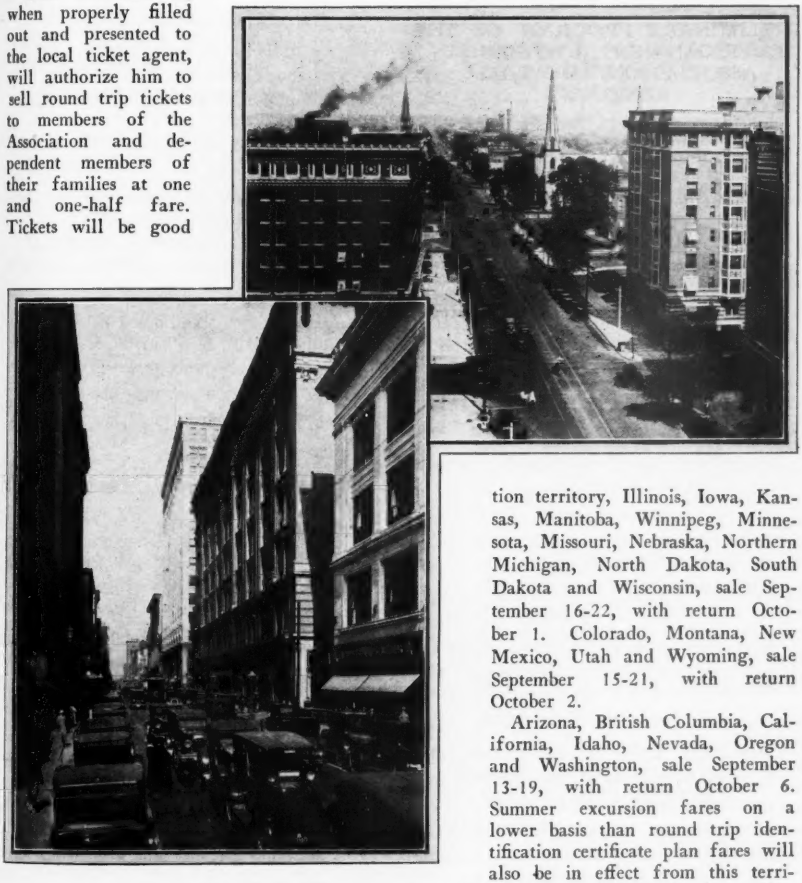
The American Dental Assistants' Association will hold its annual meeting at Louisville, Ky., September 21-25. Interesting sessions and clinics are being planned and a special luncheon for dental assistants will be held on Thursday, September 24. All dental assistants are cordially invited to attend the session headquarters in the Red Room, Second Floor, Seelbach Hotel.

ANNA H. SYKORA, *Secretary.*

REDUCED RATES TO THE LOUISVILLE MEETING

An Identification Certificate will be sent to each member of the American Dental Association, probably a month before the meeting.

This certificate, when properly filled out and presented to the local ticket agent, will authorize him to sell round trip tickets to members of the Association and dependent members of their families at one and one-half fare. Tickets will be good via the same route in both directions.



Street scenes—Louisville

Tickets will be on sale in New England, Trunk Line, Central and Southeastern Passenger Association territories, September 16-22, good returning not later than midnight, October 1.

Southwestern Association territory, Arkansas, Kansas, Louisiana and Missouri, sale September 16-22, with return October 1. Oklahoma and Texas sale September 15-21, with return October 2.

Western and Trans-Continental Association territory, Illinois, Iowa, Kansas, Manitoba, Winnipeg, Minnesota, Missouri, Nebraska, Northern Michigan, North Dakota, South Dakota and Wisconsin, sale September 16-22, with return October 1. Colorado, Montana, New Mexico, Utah and Wyoming, sale September 15-21, with return October 2.

Arizona, British Columbia, California, Idaho, Nevada, Oregon and Washington, sale September 13-19, with return October 6. Summer excursion fares on a lower basis than round trip identification certificate plan fares will also be in effect from this territory, with tickets on sale daily from May 22 to September 15, and return limit October 31.

Tickets will be validated at Louisville, at the regular ticket offices of the lines over which the tickets read, into Louisville, on any date to and including the final return limit, and when validated will be good leav-

ing Louisville on any date within the final return limit; but passengers must reach original starting point prior to midnight of final limit.

D. C. BACON, *Chairman,*
Transportation Committee.
31 N. State St., Chicago, Ill.

PRELIMINARY PROGRAM OF THE AMERICAN DENTAL HYGIENISTS' ASSOCIATION, LOUISVILLE, KENTUCKY

September 21, 22, 23, 24, 1925

(Leather Room, Second Floor, Seelbach Hotel. All subsequent meetings will be held in the same place.)

Monday morning, September 21

Registration of delegates, with examination of credentials.

Committee meeting of executive board.

Monday afternoon

Business meeting, 2 to 5 o'clock.

Tuesday, September 22

9 to 11 a. m.

Reports from state associations. (Papers limited to fifteen minutes.)

Tuesday noon

Oral hygiene luncheon, with three-minute speakers.

Tuesday afternoon, Wednesday and Thursday morning

Joint meetings with the Section on Mouth Hygiene and Preventive Dentistry of the American Dental Association.

(Y. M. C. A. Auditorium)

TWELFTH ANNUAL MEETING OF THE AMERICAN ACADEMY OF PERIODONTOLOGY

September 17, 18 and 19, 1925

(Louis XVI Room, Brown Hotel, Louisville, Kentucky.)

PROGRAM

Thursday, September 17

9:00 a. m. Registration

10:00 a. m. Opening of the Twelfth Annual Meeting, Arthur H. Merritt, President, New York City, Presiding.

Report of the Secretary-Treasurer
By J. Herbert Hood, Cleveland, Ohio

Announcements

President's address

Report of the Council
By Olin Kirkland, Chairman, Birmingham, Ala.

Report of the Fellowship Committee
By Arthur H. Merritt, New York City

Report of Committee on Nomenclature
By Andrew J. McDonagh, Toronto, Canada

Report of Committee on Dental Hygienists
By E. Melville Quinby, Boston, Mass.

Election of new members

Unfinished business

New business

2:00 p.m. Symposium on Dental Education

Report of Committee on Dental Educational Bulletins
By Gillette Hayden, Columbus, Ohio

Report of Committee on Oral Hygiene Publicity
By C. B. Fowlkes, New York City

"The Teaching of Oral Hygiene and Periodontia in Colleges of Dentistry"
By A. W. Bryan, Iowa City, Iowa

"The Teaching of Oral Hygiene and Periodontia to Dental Practitioners"
By Robin B. Adair, Atlanta, Ga.

Discussed by
Louise C. Ball, New York City
A. E. Webster, Toronto, Canada

8:00 p. m. "Some Systemic Aspects of Periodontal Disease"
By Weston A. Price
Cleveland, Ohio
Discussed by
Harold J. Leonard
Minneapolis, Minn.

Friday, September 18

9:30 a. m. Reports of Committee on Scientific Investigations
By I. Hirschfeld
New York City
Jewell M. Gompertz
New Haven, Conn.
Discussed by
Weston A. Price
Cleveland, Ohio
Justin D. Towner
Memphis, Tenn.

10:45 a. m. "Traumatic Occlusion as a Factor in Periodontia, Its Detection and Correction"
By M. M. House
Kansas City, Mo.
Discussed by
E. J. Weaver
Milwaukee, Wis.
F. A. Bricker
Hollywood, Calif.
F. H. Skinner Chicago, Ill.

12:00 m. Luncheon Discussion Groups

1. "Hygiene (Diet, Exercise, Rest, Play) and Its Relation to Periodontia."
By Grace Rogers Spalding,
Birmingham, Mich.
2. "Time Saving Methods in Periodontia Practice—Motion Study, etc."
By Justin D. Towner,
Memphis, Tenn.
3. "What Can the Periodontist Do in the Way of Promoting Oral Hygiene"
By Celia Rich
Nashville, Tenn.
4. "What is the Most Effective Method of Getting Results in Home Care"
By F. A. Bricker
Hollywood, Calif.
5. "Should Dental Hygienists be Trained in Apoxesis"
By Harold DeWitt Cross
Boston, Mass.
6. "Can Periodontia be Practiced as a Specialty in the Future"
By Paul R. Stillman
New York City

7:00 p.m. Annual banquet for members and guests
(Brown Hotel)

2:00 p. m. Reports of Luncheon Group Leaders

2:30 p.m. Clinics

Saturday, September 19

9:30 a. m. "Mouth Lesions"
By Carl Waldron
Minneapolis, Minn.
Discussed by
A. E. Webster
Toronto, Canada
Boyd S. Gardner
Rochester, Minn.

10:45 a. m. "Graduate and Research Work in Dentistry"
By William J. Gies
New York City
Discussed by
Carl W. Waldron
Minneapolis, Minn.
Weston A. Price
Cleveland, Ohio

12:00 m. Election of Officers

8:00 p. m. Banquet

THE AMERICAN SOCIETY OF ORAL SURGEONS AND EXODONTISTS

Seventh Annual Meeting, Sept. 18-19, 1925
Louisville, Ky.

OFFICERS OF SECTION

James A. Blue, President Birmingham, Ala.
Joseph P. Wahl, President Elect
New Orleans, La.
Roy S. Hopkinson, Vice President
Milwaukee, Wis.
Earl H. Thomas, Secretary Chicago, Ill.
Elmer C. Hume, Treasurer Louisville, Ky.

Friday, September 18

9 a. m. to 12 m.

Meeting of the Council 9:00 a. m.

Roll Call ..... 9:30 a. m.
President's Address
General Business
Reports of Committees

2 to 5 p. m.

"Pathologic Areas of the Mouth and the Surgical Principles Governing Their Removal"
By William L. Shearer....Omaha, Nebr.
Discussed by
Hugh W. MacMillan..Cincinnati, Ohio
Frederick F. Molt.....Chicago, Ill.

"The Operative Risk in Dental Surgery, With Special Reference to Cardiac Conditions"
By A. R. Barnes.....Rochester, Minn.
Discussed by
R. Boyd Bogle.....Nashville, Tenn.
Earle H. Thomas.....Chicago, Ill.

"Oral Surgical Prosthesis With Technic"
By A. B. Vastine.....Danville, Pa.
Discussed by
E. W. Browning....Salt Lake City, Utah
J. B. LaDue.....Chicago, Ill.

8:00 p. m.

"Systemic Expressions of Dental Infections With Special Consideration of Their Diagnosis, Treatment and Prevention"
By Weston A. Price.....Cleveland, Ohio

Saturday, September 19

9 a. m. to 12 m.

"Ideal Preparation of the Alveolar Processes Preparatory to the Construction of Dentures"
By J. W. Crawford....Milwaukee, Wis.
Discussed by
Rupert E. Hall.....Chicago, Ill.
Alexander H. Paterson....Baltimore, Md.

"Comparative Study of the Merits of Nitrous Oxid and Ethylene-Oxygen Anesthesia for Oral Surgery"
By J. A. Heidbrink.....Minneapolis, Minn.
Discussed by
John E. Seybold.....Denver, Colo.
Edward L. Moravec.....Cedar Rapids, Iowa

"The Differential Diagnosis of Tumors of the Mouth"
By J. Garland Sherrill....Louisville, Ky.
Discussed by
Theodor Blum.....New York City
E. C. Hume.....Louisville, Ky.

"Cysts of the Jaw"
By R. A. Fenton.....Iowa City, Iowa
Discussed by
Boyd S. Gardner.....Rochester, Minn.
A. L. Frew.....Dallas, Texas

2 to 5 p. m.

CLINICS

"Casts of Surgical Preparation of Enlarged Tuberosities"
By E. C. Hume.....Louisville, Ky.

"Casts Showing Cyst of Mandible and Technic Operation"
By Carol E. Brown.....Lincoln, Nebr.

"Postoperative Treatment of Mouth Wounds"
By Arnott A. Moore.....Buffalo, N. Y.

"The Upper Third Molar"
By Horace M. Davis....Baltimore, Md.

"Some Case Histories Indicative of the Relation of Impacted and Imbedded Teeth to Systemic Disturbances"
By J. A. Heidbrink..Minneapolis, Minn.

"Technic for Intra-Oral Operations Illustrated by Wax Models"
By Boyd S. Gardner....Rochester, Minn.

REPORTS ON LOUISVILLE SESSION

REPORTS OF THE LOCAL ARRANGEMENTS COMMITTEE

REPORT OF GENERAL CHAIRMAN

The Local Arrangements Committee has practically completed its work, and now awaits the arrival of the members of the American Dental Association for the Annual Session, September 21-25. It gives me pleasure to report at this time that all general arrangements are complete. Only the minor details will need our attention from this date on.

Each and every member of this committee has entered whole-heartedly into the work that he was expected to do, and has so energetically pushed his part of the program that the general chairman has had little to worry over the ultimate outcome of the arrangements.

Each section has been assigned to a well prepared auditorium, where it will not be

interrupted by sounds from any other section.

As the entire meeting will be staged in the central part of our splendid city, the members of the Association can easily get from any hotel to the farthest section meeting in an eight minute walk.

We believe that from point of attendance this meeting will be the largest that the American Dental Association has ever held. We are basing our predictions upon the number of hotel reservations already made, the number of hotel reservation blanks requested by the various state organizations, the requests for large spaces by exhibitors, our central location and the reputation of Louisville as a convention city.

From the first, we have had the best of cooperation from the Hotel Keepers' Association, and we feel sure that when our guests arrive, they will find everything in readiness for them.

Let me repeat that the local chairman has found his work easy owing to the splendid cooperation of the various members of the committee and to the great assistance rendered us by Drs. Johnson and King. Our local office is busy caring for the many details that necessarily arise.

The commercial and health exhibits, registration and the first two meetings of the House of Delegates, along with the sections on Oral Surgery and Operative Dentistry and the clinics will be held in Kosair Temple.

The Local Arrangements Committee

Other public meeting places include the Y. M. C. A., the University of Louisville Dental School and the Seelbach Hotel—all within four squares of the Brown Hotel, which is official headquarters.

Each public meeting room is a permanent auditorium with splendid facilities for carrying out our program.

Everything is in order: we bid you come.

E. C. HUME, *Chairman.*

REPORT OF SECRETARY

The Secretary has kept a complete record of all business transacted by the Local Arrangements Committee at their various meetings. This record is on file at the headquarters of the committee and is available to any officer of the American Dental Association interested in reviewing the work done by the members of this committee, either as a whole or as individuals.

J. H. FULLENWIDER, *Secretary.*

REPORT OF TREASURER

It may be of interest to the members of the American Dental Association to know how the expenses of the meetings of our association are paid. Reports of previous meetings give us the assurance that the amount necessary for this meeting will be about $30,000. This money is raised by the selling of exhibit space to manufacturers and dispensers of dental supplies.

In this report, I would then call on you to do justice to those who make possible our great meetings and say—Patronize the exhibitors.

E. H. HUBBUCH, *Treasurer.*

REPORT OF COMMITTEE ON EXHIBITS

The American Dental Trade Association will hold the greatest exhibit of dental goods in its history at Louisville.

That there is a great reaction in favor of this meeting is evidenced by the flood of orders that were received immediately after space was put on sale.

We have word that the various manufacturers and dealers will send to Louisville the most elaborate exhibits that they have ever attempted.

Kosair Temple contains the most ideal exhibit hall that has ever housed the Dental Trade Association. It is new, beautifully decorated, perfectly illuminated, naturally and artificially, and it provides an environment for the exhibits that surpasses all others of the past.

The largest decorating firm in the world has contracted to erect and maintain the exhibit, providing for each space a beautifully decorated booth, with ornamental background and posts surmounted by electric lanterns.

This wonderful hall has 25,110 square feet of floor space, with 12,502 square feet of aisle space, after the booths are in place, which insures the exhibitor that, no matter how great the attendance, there will be no undue congestion in the exhibit hall.

To date the firms listed below have made application for from one to six spaces.

GEORGE H. MEANS, *Chairman.*

EXHIBITORS

The Abbott Laboratories, Chicago, Ill.

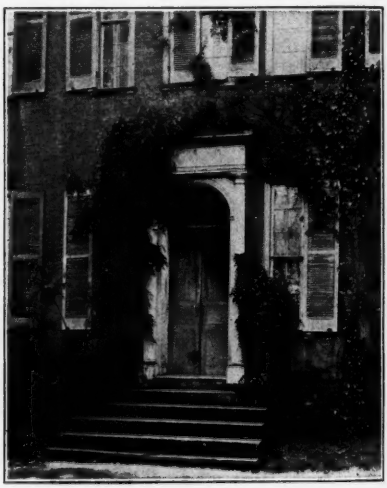
Julius Aderer, Inc., New York City.

The American Cabinet Co., Two Rivers, Wis.

The W. V.-B. Ames Co., Fremont, Ohio.

The Antidolor Mfg. Co., Springville, N. Y.

The Ascher Import Co., Inc., Cleveland, Ohio.



The "Old Kentucky Home"

Bard-Parker Co., Inc., New York City.

Becton, Dickinson & Co., Rutherford, N. J.

The Berry Dental Laboratory Co., St. Louis, Mo.

Frank S. Betz Co., Hammond, Ind.

Karl M. Bonaff, Los Angeles, Calif.

Henry P. Boos, Minneapolis, Minn.

Harry J. Bosworth, Chicago, Ill.

Bristol-Myers Co., New York City.

Buck X Ograph Co., St. Louis, Mo.

Dr. John O. Butler, Chicago, Ill.

Cameron's Surgical Specialty Co., Chicago, Ill.
Castle, Wilmot Co., Rochester, N. Y.
The L. D. Caulk Co., Milford, Del.
Chayes Dental Instrument Corporation, New York City.
Claudius Ash, Sons & Co., New York City.
The Cleveland Dental Mfg. Co., Cleveland, Ohio.
Colgate & Company, New York City.
Columbia X-Ray & Electric Corporation, New York City.
Columbus Dental Mfg. Co., Columbus, Ohio.
Cook Laboratories, Inc., Chicago, Ill.
Corega Chemical Co., Cleveland, Ohio.
Crocker Fels Co., Cincinnati, Ohio.
T. M. Crutcher Dental Depot, Inc., Louisville, Ky.

Thomas J. Dee & Co., Chicago, Ill.
Dentists' Supply Co., New York City.
The Denver Chemical Mfg. Co., New York City.
Detroit Dental Mfg. Co., Detroit, Mich.
Dick X-Ray Co., St. Louis, Mo.
Dresch Laboratories Co., Toledo, Ohio.

Eastman Kodak Co., Rochester, N. Y.
Electro Dental Mfg. Co., Philadelphia, Pa.

Falls City Dental Specialty Co., Louisville, Ky.
Fellows Medical Mfg. Co., New York City.
Flossy Dental Mfg. Co., Evanston, Ill.
Foregger Co., Inc., New York City.
Friedman Specialty Co., Chicago, Ill.
Hugo Friedman Mfg. Co., Chicago, Ill.

Gambill Dental Specialties, Merkel, Texas.
Garhart Dental Specialty Co., Somerville, Mass.
Clyde M. Gearhart, Washington, D. C.

Hanau Engineering Co., Buffalo, N. Y.
Hanovia Chemical Mfg. Co., Newark, N. J.
Harmeyer & Brand Co., Cincinnati, Ohio.
Harvard Co., Canton, Ohio.
The Heidbrink Co., Minneapolis, Minn.
Horlick's Malted Milk Co., Racine, Wis.

J. W. Ivory, Philadelphia, Pa.

J. F. Jelenko & Co., New York City.
Johnson & Johnson, New Brunswick, N. J.
H. D. Justi & Son, Philadelphia, Pa.

Kansas City Oxygen Gas Co., Kansas City, Mo.
Kayle Co., Inc., New York City.
The Kolynos Co., New Haven, Conn.
Kress & Owen Co., New York City.

Lambert Pharmacal Co., St. Louis, Mo.
H. R. Lathrop & Co., Inc., New York City.
Lavoris Chemical Co., Minneapolis, Minn.
Lea & Febiger, Philadelphia, Pa.
Lehn & Fink, Inc., New York City.
The Lochhead Laboratories, Inc., New York City.

Medical Protective Co., Fort Wayne, Ind.
The Wm. S. Merrell Co., Cincinnati, Ohio.
H. A. Metz Laboratories, Inc., New York City.
Dr. Miller's Liquidam, Williamsport, Pa.
I. F. Miller Dental Laboratory, Pittsburgh, Pa.
The Minimax Co., Chicago, Ill.
Mizzy, Inc., New York City.
The C. V. Mosby Company, St. Louis, Mo.
Mynol Chemical Company, Philadelphia, Pa.

The J. M. Ney Company, Hartford, Conn.
Novocol Chemical Co., Inc., Brooklyn, N. Y.

Ohio Chemical & Mfg. Co., Cincinnati, Ohio.

The Pepsodent Company, Chicago, Ill.
The Charles H. Phillips Chemical Co., New York City.
The Poloris Co., New York City.
Prometheus Electric Co., Philadelphia, Pa.
Prophylactic Tooth Powder, Inc., New York City.

Ransom & Randolph Co., Toledo, Ohio.
Ritter Dental Mfg. Co., Rochester, N. Y.

The Senreco Corporation, Cincinnati, Ohio.

Lee S. Smith & Son Mfg. Co., Pittsburgh, Pa.

The Sodiphene Co., Kansas City, Mo.

E. R. Squibb & Sons, New York City.

I. Stern & Co., New York City.

St. Paul Welding & Mfg. Co., St. Paul, Minn.

Sam'l G. Supplee & Co., New York City.

Toledo Dental Supply Co., Toledo, Ohio.

Toledo Technical Appliance Co., Toledo, Ohio.

Vernon Brothers & Co., Pittsburgh, Pa.

Vibro-Dental Products, Inc., Philadelphia, Pa.

Victor X-Ray Corporation, Chicago, Ill.

The Weber Dental Mfg. Co., Canton, Ohio.

Werner Garments Inc., Cincinnati, Ohio.

S. S. White Dental Mfg. Co., Philadelphia, Pa.

H. B. Wiggins' Sons Co., Bloomfield, N. J.

The Wilkinson Co., Santa Monica, Los Angeles, Calif.

The Williams Gold Refining Co., Buffalo, N. Y.

Wilmot Castle Co., Rochester, N. Y.

Wisconsin Electric Co., Racine, Wis.

John H. Wood Co., Philadelphia, Pa.

PUBLICITY

The Publicity Committee has been busily engaged since the first of the year in furnishing articles, pictures, etc., to the various dental journals and local newspapers; in securing appointments for radio talks; in preparing and mailing out hotel reservation blanks; in keeping in touch with the various state societies through letters, telegrams of invitations, etc., and in doing everything possible to make the coming meeting the biggest and best the American Dental Association has ever staged. We feel proud of our stickers typifying Kentucky and Louisville, 240,000 of which are being used by the various dental supply houses.

Arrangements have been made with the local press to cover the meeting, so that the public may get all the important happenings. Papers of essayists should be forwarded to the chairman of the committee at least six weeks before the meeting, so that it will be possible for us to give to the world through the Associated Press advance notice of the various subjects that will be discussed.

A. M. HARDAWAY, *Chairman.*

REPORT OF LOCAL ARRANGEMENTS COMMITTEE ON DENTAL HEALTH EXHIBIT

There has been reserved for the dental health exhibit upward of 6,000 square feet of floor space adjacent to the commercial exhibits. There will be a definite effort made to concentrate on quality exhibits rather than quantity.

If dentistry is going to stand the test of the searching light of scrutiny that is being turned on it by the laymen, it is essential that the dental profession grasp the idea of so training the oncoming generations in mouth hygiene and nutrition that dental ills will be materially reduced, and our prospective clientele will be educated to the point where they will seek the advice and council of the dentist before it is necessary to lose the pulps of their teeth.

The health exhibit has in mind the crystallization of this idea in such a fashion that the visiting dentists will go back to their clientele and become teachers of these fundamental truths, thereby rendering their community an unselfish service of inestimable value.

One of the features of the health exhibit will be daily demonstrations by the American Association of Dental Hygienists. This in itself will be well worth your attendance at this meeting.

RAYMOND E. GRANT, *Director,*
Dental Health Exhibit, Local Arrangements Committee.

CLINICS

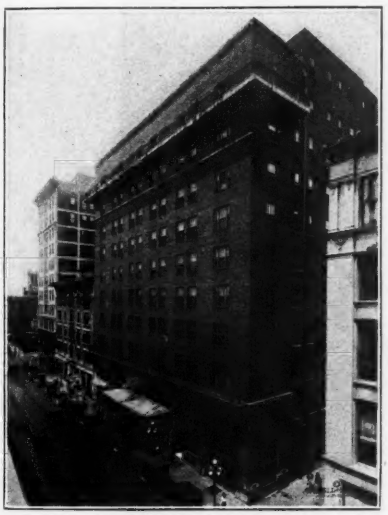
The clinics to be held at the Louisville meeting are expected to surpass all those presented at former annual sessions.

The table and group clinics will be held in the beautiful new Kosair Shrine Temple, which, incidentally, is the hub of the meeting. The hall, which is the largest dance

hall in the South, is beautifully decorated and well lighted and ventilated.

The various clinics will be grouped and numbered, and names of clinicians given, so that the dentists will be able to see at a glance the type of clinic given.

Just across the street is our dental college, in which will be given the chair clinics. Here, there are ample facilities for any kind of chair clinic.



Hotel Watterson

Because of Louisville's central location, we expect to present more clinics than have ever been given before, for everybody will be here. Every type of clinic known to the dental profession will be shown.

The clinicians are to be approved by the president and secretary of the various state societies, and no dentist can afford to miss this wonderful opportunity to see their skilful work and technic.

WILLIAM E. GOEPPER, *Chairman.*

HALLS AND HOTELS

The committee on Halls and Hotels has secured contracts for all public meeting places to be used by the American Dental Association including Kosair Temple, in which will be held the commercial and health exhibits, along with the Sections on Oral Surgery and Operative Dentistry and the clinics. Registration will be at this building, as well as the first two meetings of the House of Delegates.

Other public meeting places include the Y. M. C. A., University of Louisville College of Dentistry, Brown Hotel and Seelbach Hotel. This arrangement will place the entire meeting, with the exception of one section, within four squares, on one street. All of these rooms are in permanent buildings, and were designed for public meeting places. They are splendidly ventilated, well lighted and easily darkened, and are remote from the noise of the various other sections.

The local Hotel Keepers' Association has guaranteed ample hotel accommodations for the big meeting. However, this committee wishes to urge those expecting to attend to occupy rooms with some friend, or friends, as this will greatly increase facilities for caring for a larger number. We expect the largest attendance that the American Dental Association has ever had, and we are anxious to afford the best accommodations possible.

We are basing the foregoing predictions on the fact that more people can get to Louisville within a twelve hours' ride than to any other city in the United States, and that a great number of members are making up parties to motor to the meeting and see some of the special points of interest in the famous Blue Grass State.

Information relative to hotels will be found in the announcement department in this issue of THE JOURNAL.

FRANK B. HOWER, *Chairman.*

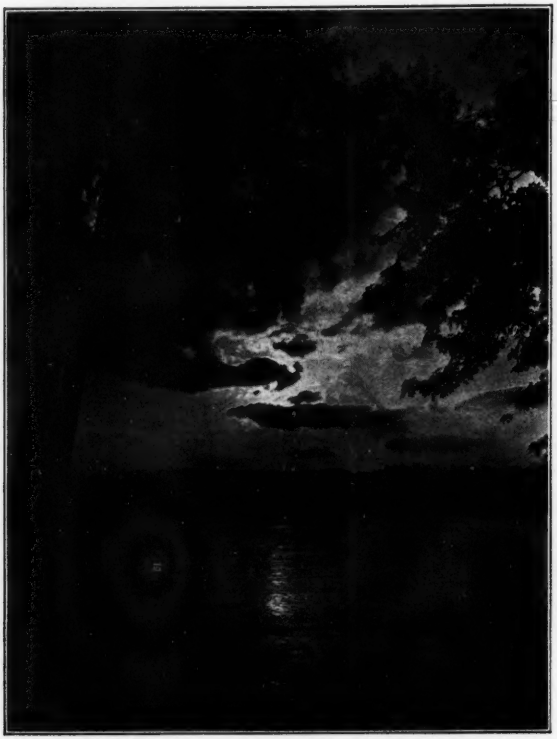
INFORMATION AND REGISTRATION

Information headquarters will be at Kosair Temple, 220 East Broadway, and booths will be at the railroad stations and the following hotels: Brown, Seelbach, Kentucky, Tyler, Watterson and Elks Athletic Club. Arrangements have been made to give any information desired. When in doubt ask the "Man in the Booth."

Registration headquarters will be located at the Kosair Shrine Temple. It is most important to have your 1925 MEMBERSHIP CARD with you, in order to avoid

any embarrassment, confusion or delay at Registration headquarters, for no one will be admitted without his MEMBERSHIP CARD.

CHARLES S. PEARCY, *Chairman.*



Sunset on the Ohio—Shawnee Park

ENTERTAINMENT

The Entertainment Committee this year is endeavoring to carry out a plan to conform to a resolution passed by the Board of Trustees. The committee is focusing its efforts on three main features. This does not produce such a quantitive program, but the quality stands out to a degree to make quantity a negative issue. It is the earnest desire of the Entertainment Committee that all organizations holding functions on Monday night cooperate with the committee by calling their meetings earlier than has been the custom, thereby adjourning earlier. This arrangement will permit everyone to gather at Kosair Temple for the American Dental Association dance and entertainment. As this feature of the program is for the pleasure of every member of the American Dental Association, we sincerely trust that each member will feel himself delegated as a committee of one to make it a success. Entertainment will be provided for those who do not dance. The committee believes that anyone who misses this feature of the program will always regret it. Let's pull together and make the dance and entertain-

ment this year a "never to be forgotten" affair.

The following program will be given for the visiting ladies of the American Dental Association, Tuesday afternoon: Col. Tandy Ellis, of Lexington, Ky., will present the "Old Time Negro," his dialect, manners, customs, etc. He will also sing the old time songs, using the banjo as an accompaniment. Colonel Ellis is a nationally known writer on the subject of the old time negro, and we feel that he has a treat in store for everyone. Do not fail to be present. You will miss something worth while. It is the plan of the Entertainment Committee to have our President, the grand old man of dentistry, C. N. Johnson, at this meeting to welcome the ladies on behalf of the American Dental Association.

On Wednesday afternoon, another treat is in store. The Louisville Conservatory of Music will render a splendid program, and the committee sincerely trusts that you will take advantage of the opportunity to hear these artists. The program will consist of piano, violin and vocal solos.

On Thursday afternoon, there will be a tour of the shopping district.

Two side trips have been arranged—one to the Lincoln Shrine and Birthplace and the other to Mammoth Cave.

LINCOLN SHRINE AND BIRTHPLACE

The train will leave Louisville, Friday, September 25, at 1:30 p. m., returning to Louisville possibly around 8:30 p. m. The cost of this trip will be $4.75, which includes round trip railroad transportation, round trip taxi fare from the railroad station at Hodgenville (the Shrine is located 3 miles from the railroad station) and dinner at Hodgenville. As Hodgenville is a small town, it is imperative that the exact number desiring to make this trip be known Tuesday night, September 22. A booth will be located in Registration headquarters, Kosair Shrine Temple, on Monday for reservations. On Tuesday, reservations can be secured at the Brown Hotel. All who anticipate taking this trip will have to secure reservations on or before Tuesday night, September 22. As reservations positively cannot be secured after Tuesday, September 22, 6:00 p. m., please be governed accordingly.

A Kentucky Beauty

MAMMOTH CAVE

The train will leave Louisville, Saturday, September 26, at 9:00 a. m., returning to Louisville that night. The cost of the

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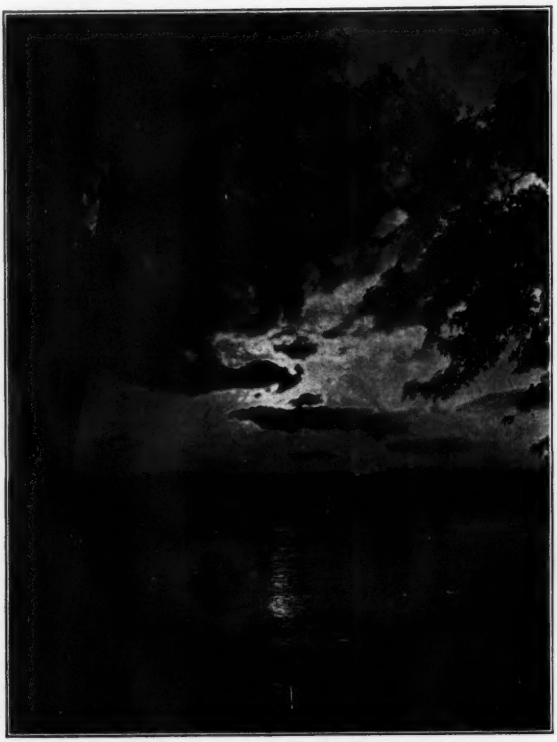
CHARLES S. PEARCY, *Chairman.*



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A Kentucky Beauty

MAMMOTH CAVE

The train will leave Louisville, Saturday, September 26, at 9:00 a. m., returning to Louisville that night. The cost of the

trip will be $8.50, which includes round trip railroad transportation, two meals at the new Mammoth Cave Hotel and choice of either the Martha Washington Star Chamber or the Echo River trip through the cave. Reservations, which will be accepted until time for the departure of the train, can be secured at the Brown Hotel.

ROBERT P. THOMAS, *Chairman.*

Lincoln Memorial

TRANSPORTATION

The Transportation Committee assures those who come to Louisville that they will have no difficulty in getting from one meeting place to another. The distance from the farthest hotel to the hub of the meeting can be covered in a sixteen minute walk. Busses, street cars and taxicabs are available at all times.

We call the attention of the membership to the splendid opportunity to motor to Louisville. You can be assured of a delightful trip, good roads and beautiful scenery, at the best time of the year for motoring. Louisville is well able to take care of the cars as to storage and parking. Many public garages are close to the hotels. The accompanying map is published to help you to select the best possible routes.

The Louisville Automobile Club will give information free to members, there being a slight charge to nonmembers. The Courier-Journal and Louisville Times Touring Bureau will at all times give the latest and best road information free.

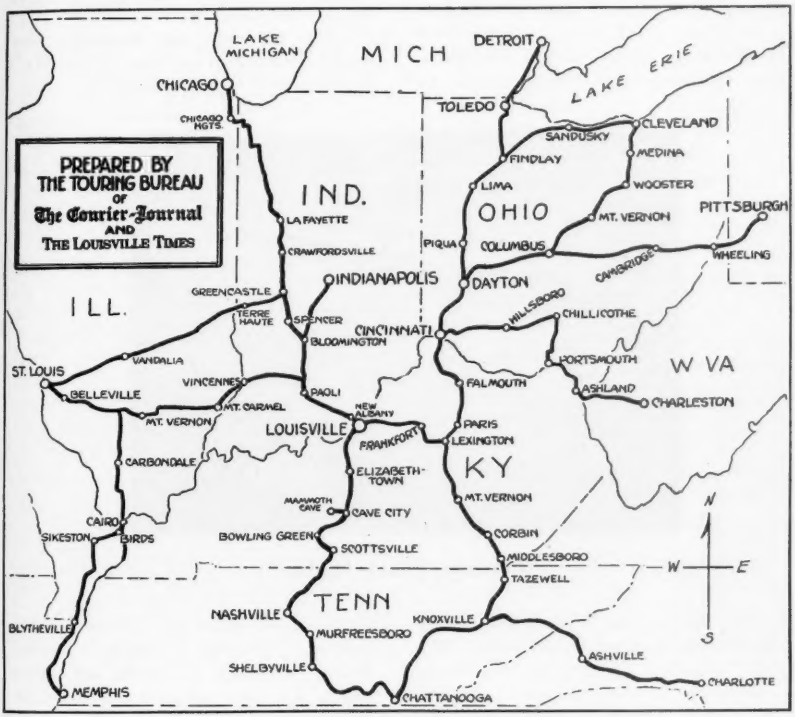
It is suggested that those who are considering motoring to Louisville apply to the above named agencies shortly before starting, for the latest road information.

ROBERT L. SPRAU, *Chairman.*

MOTORING TO LOUISVILLE

Pittsburgh: 681 miles via Washington, thence over National Old Trails to Dayton and Cincinnati to Louisville. Paved

road. At Washington, the first Masonic Temple west of the Allegheny Mountains is located. Dayton is the birthplace of the airplane. Wilbur Wright Field, the largest and most perfect air field in the world, is now operated by the U. S. Government. The first house built was known as "Newcomb's Tavern." In the early times it was a famous trading post and the point of many attacks from the Indians. Tourists find the house with its ineffaceable colonial atmosphere and old sundial of great interest. Then through the bluegrass section of Kentucky, pausing at Frankfort for a view of the state capitol and also the state penitentiary.



AUTOMOBILE MAP

Cleveland: 465 miles via Wooster, Columbus, Dayton, Cincinnati and Louisville. Gravel and pavement. Famous Rookwood pottery is made at Cincinnati.

Cleveland: 475 miles via Findlay, Lima, Dayton, Cincinnati and Louisville. Paved road. Lake View Cemetery is one of the most beautiful in America. It contains the Garfield memorial, the Wade memorial chapel and the Rockefeller monolith, the largest single-stone spire erected anywhere. On this same street is the entrance to Mr. Rockefeller's "Forest Hill" estate.

Toledo: 395 miles, via Findlay, Dayton, Cincinnati and Louisville. Paved road.

Chicago: 339 miles via Dyer, Crown Point, Lafayette, Crawfordsville, Greencastle,

Spencer, Bloomington, Paoli, New Albany and Louisville. One and a half mile bad stretch coming into New Albany. Gravel and pavement. Lafayette is the seat of Purdue University, which is one of the best technical schools in America. Seven miles west of the city is the famous Tippecanoe battleground. East of Lafayette is the Crouch stock farm. All interested in fine horses should visit these stables. Five miles south of Greencastle is the Indiana State penal farm. Crawfordsville was the home of the author of "Ben Hur," Gen. Lew Wallace, in whose honor a monument has been erected.

St. Louis: 305 miles via Ashley, Fairfield, Mt. Carmel, Vincennes, Paoli and New Albany. Good pavement practically all the way through Illinois, and good stone and gravel road through Indiana.

Memphis: 543 miles via Blytheville, Leachville, Dexter, Sikeston, Cairo, Ashley, Mt. Carmel and Vincennes. Gravel and stone to Vincennes and pavement to Cairo. Inquire at Cairo as to the latest road conditions to Memphis. The Ayer-Lord tie plant, the largest of its kind, is located at Carbondale, Ill.

Nashville: 205 miles via Gallatin, Scottsville, Bowling Green, Elizabethtown and Louisville. Two detours between Bowling Green and Glasgow Junction. Glasgow Junction and Horse Cave, rough macadam. Three miles bad stretch between Bonnieville and Upton. Five mile detour on north end of Camp Knox, bad when wet. On this route is the world famous Mammoth Cave.

Asheville: 366 miles via Knoxville, that summer resort in "The Land of the Sky." Paved, gravel and sand clay road.

Louisville Tobacco Market

Knoxville: 302 miles via Tazewell, Middleboro, Pineville, Corbin, London, Berea, Richmond, Lexington and Louisville. The Dixie Highway is closed between London and Berea. Detour via Crab Orchard, Lancaster, Nicholasville and Lexington. Detour rough but passable. Seven mile bad stretch between Barbourville and Corbin, bad when wet. State furnishes free towing service. Paved, gravel, stone and dirt roads. Crab Orchard Springs, one of Kentucky's famous health resorts.

ATTENTION, GOLFERS*

There will be a dinner and Calcutta Pool Sunday night, September 20, in the Rathskeller, Seelbach Hotel.

*Preliminary announcement subject to revision.

Because of prevailing local conditions (Louisville, a growing city of more than 300,000, having only four golf courses) the usual custom of having but one qualifying day will be set aside. We may also have to follow the Cleveland plan of assigning the players to different courses. Players are assured of all the golfing they may desire.

Qualifying rounds may be played on Monday, Tuesday or Wednesday, September 21-22-23. All qualifying must be in foursomes, and must so register before starting.

The names of those qualifying in the different classes will be posted in the Brown and the Kentucky Hotel by Thursday morning, September 24.

The play-off events in these classes will be held Friday, September 25, all playing at the Audubon Country Club, unless the decision is made to divide the numbers as to classes, assigning some players to another club.

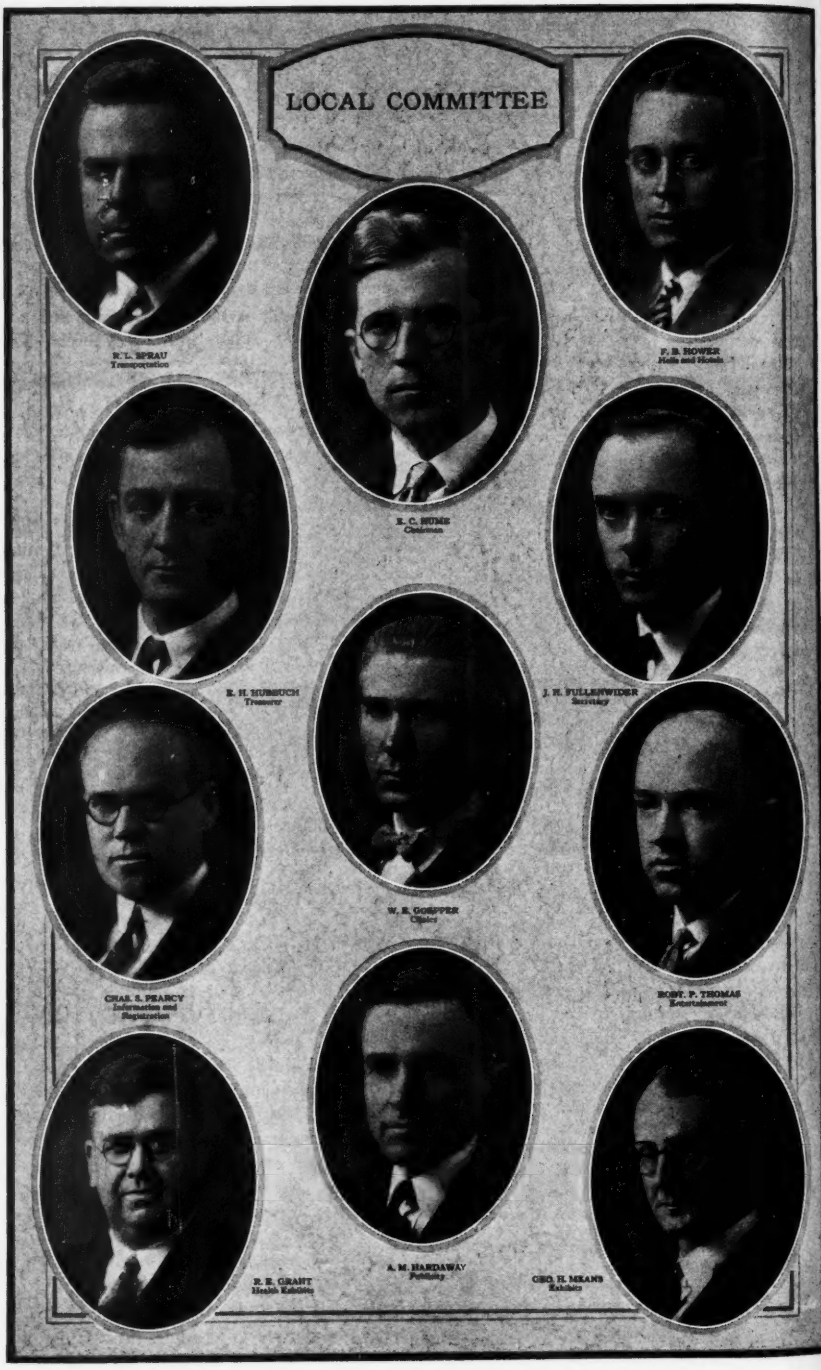
An array of handsome prizes will be given. We want all golfers of the American Dental Association to be members of the Section of Golfing. Send in your application, with $3.00, which entitles you to a life membership without further dues. For any other information, a letter addressed to the undersigned committee will receive prompt attention.

THOMAS P. HINMAN, *Sec'y-Treasurer,*
Fourth Nat'l Bank Bldg., Atlanta, Ga.
LOUIS C. BURGARD,
Vice President; Chairman,
Local Arrangements Committee,
817 Starks Bldg., Louisville, Ky.

AMERICAN DENTAL TRAPSHOOTERS' LEAGUE

The next meeting of the American Dental Trapshooters' League will be held in Louisville, Kentucky, September 21, at 1 o'clock p. m. All ethical dentists are invited to participate in the contest. The championship cup will be the most beautiful and valuable cup ever offered at a national meeting. The loving cup is also a very handsome one. A number of other valuable prizes will be given for the next best scores. I am in communication with a great number of trapshooters throughout the country and believe that the attendance will be large. Therefore, the contest must begin at 1 o'clock sharp.

GROVER C. SMITH, *Secretary,*
3155 S. Grand Avenue,
St. Louis, Mo.



Sixty-Seventh Annual Session of the American Dental Association, Louisville, Kentucky, September 21-25, 1925.

Announcements

CALENDAR OF MEETINGS

NATIONAL SOCIETIES

American Academy of Periodontology, Louisville, Kentucky, September 17-19, 1925.

American Dental Assistants' Association, September 21-25, 1925, Louisville, Kentucky.

American Dental Hygienists' Association, September 21-25, 1925, Louisville, Kentucky.

American Dental Association, September 21-25, 1925, Louisville, Kentucky.

American Dental Society of Europe, July 28-31, London.

American Medical Association, 1926, Dallas, Texas.

American Society of Oral Surgeons and Exodontists, September 18-19, 1925, Louisville, Kentucky.

Belgian Congress of Stomatology, July 11-14, 1925, Brussels, Belgium.

Fédération Dentaire Internationale, August 2-6, 1925, Geneva, Switzerland.

National Association of Dental Examiners, Louisville, Kentucky, September 21-22, 1925.

Pacific Coast Dental Conference, June, 1926, Portland, Oregon.

Seventh International Dental Congress, August 23-28, 1926, Philadelphia, Pennsylvania.

STATE SOCIETIES

District of Columbia, at George Washington University, Washington, D. C., second and fourth Tuesdays in each month from October to June, inclusive.

National Capital at Washington, D. C., first Tuesday of every month.

July (1925)

Montana, at Great Falls (29-31).
Porto Rico, at San Juan (5-6).
Rhode Island, at Newport.
Wisconsin, at Madison (14-16).

September (1925)

Kentucky, at Louisville (18-19).

October (1925)

Florida, at Orlando.
New England, at Boston, Mass. (15-17).

December (1925)

Nevada, at Reno (5).
Ohio, at Columbus (1-3).

February (1926)

Minnesota, at St. Paul (10-12).

MEETINGS OF THE STATE BOARD OF DENTAL EXAMINERS

Montana, at Helena, July 13-17, 1925. Secretary, Marshall E. Gates, Helena, Montana.

North Dakota, July 14, 1925. Secretary, W. E. Hocking, Devils Lake, North Dakota.

THE DENTAL EDUCATIONAL COUNCIL OF AMERICA

The Dental Educational Council of America cordially endorses the Carnegie Foundation's formal conclusion that dentistry is an independent division of health service which is attaining the full equivalence of an oral specialty of medicine, and commends these views of the Foundation to the attention of the public and of the medical and dental professions.

ALBERT L. MIDGLEY, *Secretary*,
315 Butler Exchange,
Providence, R. I.

PSI OMEGA FRATERNITY

The National Alumni Chapter meets in Louisville, Kentucky, Monday, September 21, 1925, at the Kentucky Hotel, which will be headquarters for the Fraternity. The first session will be held at 10 a. m. and the second at 2 p. m. The annual banquet for members and ladies will be held at 6:30 p. m., Monday, September 25.

HAROLD S. SMITH, *Grand Master*,
1010 Belmont Ave.,
Chicago, Ill.

M. J. COUCH, *Secretary*,
3801 Broadway,
Chicago, Ill.

DELTA SIGMA DELTA FRATERNITY

The forty-first annual meeting of the Supreme Chapter of Delta Sigma Delta Fraternity will be held in the Seelbach Hotel, Louisville, Ky., Monday, September 21, 1925, at 9:30 a. m. The regular order of business will be carried out both at morning and afternoon sessions, to be followed by the initiatory exercises in the afternoon. All of our activities as far as possible will take place in the above-mentioned hotel. Information as to the place for holding the annual banquet in the evening will be announced at the morning session. To avoid delay in registration, please present your membership card. Those expecting to attend should promptly notify Dr. Frank B. Hower, Francis Building, Louisville, Ky.

By order of the Supreme Chapter,

MARK E. VANCE, *Supreme Grand Master*,
Lincoln, Nebr.

R. HAMILL D. SWING, *Supreme Scribe*,
Locust at 15th Street, Philadelphia, Pa.

NEW BOOKS RECEIVED FOR THE LIBRARY OF THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION

The Journal of the American Dental Association promptly acknowledges herewith the receipt of new publications. Books selected from those named on this list are reviewed below. Reviews are matter-of-fact statements of the nature and contents of the publication referred to and are intended *solely to guide possible purchasers.*

The Life and Work of James Leon Williams. By George Wood Clapp, D.D.S., with introduction by C. N. Johnson, D.D.S., F.A.C.D., President of the American Dental Association. New York: The Dental Digest Publishing Co., 1925. Illustrated; pp. 299.

The biography of Dr. Williams is presented in five parts covering: 1. Ancestry and childhood. 2. Histological and Bacteriological Discoveries and Presentations. 3. The Discovery of Typal Forms in Human Teeth and the Reproduction of Them in Artificial Teeth. 4. Dr. Williams as an Anthropologist. 5. Painting—Literary Miscellany.

Preventive Dentistry for Dental Students. By Alfred C. Fones, D.D.S., Bridgeport, Conn., formerly Professor of Preventive Dentistry in the Columbia University Dental School, New York City. Philadelphia and New York. Lea & Febiger, 1925. Illustrated; pp. 220.

According to the preface, only some of the main subjects are touched upon, as it would be impossible in the first book on preventive dentistry to cover all the phases which have a definite influence in securing sound teeth and healthy mouths. In the author's opinion a chair of preventive dentistry should be established eventually in each of our dental schools. "A vivid picture of normality, its production and maintenance, should be presented to the student mind, and only through a continuous course, carrying a continuity of thought can this subject be made sufficiently impressive."

PATENTS OF INTEREST TO DENTISTS

1454632. Artificial tooth, Leon M. Farnum, Lansdowne, Pa.

1454290. Dental casting apparatus, Edward J. Kochmit, Cleveland, Ohio.

1455518. Dental tray, Louis Balter, New York City, N. Y.

1455047. Hypodermic syringe, Luella L. Goold, Arlington, Mass.

1455491. Electric clutch coupling for use in dental technics, Emile Huet, Brussells, Belgium.

1454938. Folding toothbrush, G. E. W. Miller, Boston, Mass.

Copies of above patents may be obtained for twenty-five cents each, by addressing John Saul, Solicitor of Patents, Federal Building, Washington, D. C.

Fourth annual dinner of the Educational and Efficiency Society for Dental Assistants, First District, N. Y., Inc., given at the Hotel Astor, May 16, 1925.

AMERICAN DENTAL ASSOCIATION

SIXTY-SEVENTH SESSION

LOUISVILLE, KY., SEPT. 21-25, 1925

HOTEL RESERVATIONS

In securing hotel reservations for the coming convention, consult the hotel rate-sheet and fill out the blank application below. Mail immediately to the hotel of your choice. The hotel will then advise you of the reservation it has made for you.

KEEP THIS REMINDER OF YOUR RESERVATION

Hotel Selected .....

No. of Rooms .....

No. of Persons .....

Date of Reservation 1925

Detach here and keep for reference.

MAIL THIS APPLICATION DIRECT TO HOTEL

HOTEL RESERVATION

American Dental Association, Louisville, Ky., Sept. 21-25, 1925

.....HOTEL 1925

Louisville, Ky.

Please reserve for me the following:

.....Room(s) with bath, for.....people. Rate desired $.....
(per day)

.....Room(s) without bath, for.....people. Rate desired $.....
(per day)

I hereby agree to pay for rooms described from morning / evening of September.....to September....., unless cancellation is made by Aug. 31, 1925.

List names and addresses of all who will occupy room with you.

Name ..... Address .....
Street, City and State.

Name ..... Address .....
Street, City and State.

Name ..... Address .....
Street, City and State.

Name .....

Street .....

City ..... State .....

HOTEL ROOM RATES – LOUISVILLE

HOTEL	ROOM WITH BATH		ROOM WITHOUT BATH	
	One person per day	Two persons per day	One person per day	Two persons per day
BROWN	3.00-7.00	6.00-10.00		
ELKS' CLUB	3.00-3.50	5.00- 7.00	2.00-2.50	
KENTUCKY	3.00-7.00	5.00-10.00		
KOSAIR TEMPLE	2.50-4.00	5.00- 7.00	2.00-2.50	
LOUISVILLE	2.50-5.00	4.50- 7.00	2.00	3.50
SEELBACH	3.00-7.00	5.00- 9.00	2.50-3.00	4.00-4.50
TYLER	3.00-5.00	4.50- 7.00		
WATTERSON	3.00-5.00	5.00- 8.00	2.50	4.50

Members are requested to procure roommates, especially those members from the larger centers, who are requested to go four or five in a large room. By so doing, they will get better rooms.

FRATERNITY HEADQUARTERS

XI PSI PHI	WATTERSON HOTEL
DELTA SIGMA DELTA	SEELBACH HOTEL
PSI OMEGA	KENTUCKY HOTEL

What It Has Been---It Will Be

By Ernest V. Madison

ADVERTISING is a medium of quick introduction. It is a medium through which the inventor, maker, chemist or builder can notify the population collectively that he has learned something that will benefit it; and that he has put that knowledge into a tangible form, available for use.

It is a medium for popularizing a demand for articles that advance human welfare—until the cost of production is reduced and the selling price brought within reach of the great public.

* * * * * *

Advertising in business papers constitutes an important division of this utilitarian force.

It has brought to the maker a method for creating a demand among distributors—those who are directly interested.

It has brought to the manufacturer a knowledge of machines and raw materials that lower manufacturing cost and raise the standards of his product.

It has brought to the retailer a knowledge of modern mercantile methods. It has enabled him to take advantage of quick fluctuations of prices.

It has been the pioneer in extending the frontier of sales.

It has paved the way for consumer advertising.

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THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION is a business paper. In its advertising pages, manufacturers tell us about their products for use in the dental field.

We should read these advertisements.

For what advertising has been, it will be.